







ANNALS  
OF THE  
SOUTH AFRICAN MUSEUM

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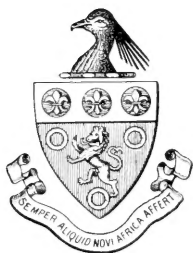
*VOLUME XVIII.*





ANNALS  
OF THE  
SOUTH AFRICAN MUSEUM

*VOLUME XVIII.*



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I.—*On the Bombyliid Fauna of South Africa (Diptera) as represented in the South African Museum.*—By Prof. M. BEZZI.

(With Plates I and II.)

SINCE the publication of H. Loew's general treatment of the family Bombyliidae in his classical work of 1860 on the South African Dipterous Fauna,\* no other paper has appeared dealing especially with this group of flies, which seems, however, to be plentifully represented in that country.

In the old publications of Linnaeus, Fabricius, Thunberg and Olivier, as also in the earliest papers of Wiedemann on the insects of the Cape (1818–1819), and even in the general works of Wiedemann, Macquart and Walker, there are numerous species described, most of which had not been recorded subsequently. In addition, after 1860 many other new forms have been added by Adams, Bigot, Hermann, Karsch, Loew, Ricardo, Romani, Schiner, Walker, Westwood, etc. But all these descriptions are scattered, often hardly accessible, and by no means arranged systematically; therefore a general survey of the subject seems to be not devoid of importance.

It was then with the greatest pleasure that I received through the kindness of Dr. L. Péringuey the very rich collection of South African Bombyliidae in the South African Museum. At the same time I had already before me extensive collections of Ethiopian Bombyliidae from

\* “Die Dipteren-Fauna Südafrikas,” ‘Abhand. Naturw. Ver. für Sachs und Thuring in Halle,’ Berlin, 1860.

the British Museum, and others from the Hungarian Museum at Budapest. To these collections I have added the species received from the Albany Museum, Grahamstown, and those sent me by Dr. Brauns of Willowmore (Cape). This large amount of material enables me to give here a general review of the group, and to describe many new genera and species.

The collection contains a number of species determined by Bigot, who had prepared a paper on the Diptera sent him from the Cape by Dr. Péringuey.\* Most of these species have never been published; but many of them were evidently classified from Macquart's types in Bigot's collection. For instance there is a type of *Lasioprosopa bigoti*, Macquart, 1855, described from Oceania, which is none other than *Corsomyra nigripes*, as already stated by Schiner, who had received the species from Macquart himself; this important synonymy has not been as yet recorded in the catalogues.

The Bombyliid Fauna of South Africa, as compared with that of the remainder of the Ethiopian region, shows some peculiar characters, which make it at once recognisable.

Firstly there is a large number of purely endemic genera, such as *Adelidea*, *Crocidium*, *Nomalonia*, *Péringueyimyia*, and some new ones—*Sosiomyia*, *Oniomyia*, *Pseudempis* and *Pteraulax*. But the main characteristic is the presence of the genera *Corsomyra* and *Callynthrophora*, which, with their now known 10 species, are exclusively South African; they represent certainly an endemic line of development which is no doubt adapted to some special characters of endemic flowers, to which they are adapted for pollination, as shown by their extraordinary facial brush. Very characteristic among the important genera is the great number of the species of *Bombylius*—a genus which is most sparingly represented in Central Africa; eminently peculiar are some groups of species, like that of the allies of *Bombylius micans*, and that of *B. lateralis* and *bivittatus*. The related genera *Systoechus*, *Anastoechus* and *Dischistus* comprise also characteristic species, chiefly those of the two first-named genera, which are very close to those of the group of *Bombylius micans*. *Lomatia* has a good series of peculiar forms, very often remarkable for their great size. In the genera *Anthrax* and *Spongostylum* peculiar specific forms are scarce, and so are likewise those included in the genera *Thyridanthrax*, *Villa* and *Litorhynchus*. Against this a great number of characteristic species is to be found in *Exoprosopa*, some subgenera of which, like *Metapenta* and *Acrodisca*, and also groups, like those of *heros*, *seniculus*, *capensis*, etc., are exclusively or pre-eminently South

\* Quoted by Bigot himself in 'Ann. Soc. Ent. France,' 4, xi, 1892, p. 371.



African. Poor in representatives is the genus *Hyperalonia*, which for a long time was believed to be absent from the Cape Fauna.

The classification of the family will be dealt with by me in my forthcoming general work on the Bombyliidae of the Ethiopian region in the British Museum; the classification has recently made great progress through the valuable contribution of my friend Th. Becker, 'Genera Bombyliidarum,' 1913, in which he recognised no less than fifteen subfamilies.

I give here a synoptic table of the groups and of the genera represented in the collection of the South African Museum.

- 1 (54). Hind border of the eyes not indented, or very rarely with a deep sinuosity only (*Eurycarenum*); eyes without a bisecting line.
- 2 (47). Occiput flat, not bilobate above and without a central cavity; occipital fringe typically placed at the border of the eyes.
- 3 (46). Prothorax less developed and not especially setose.
- 4 (45). Metasternum not specially developed; hind legs not specially strong; eyes of the females separated; body rather broad and more or less pilose.
- 5 (22). Tibiae with 3 rows of long spicules; proboscis long; palpi single-jointed; metapleurae usually hairy; body bristly.
- 6 (21). Abdomen broad, of oval or rotund shape; antennae approximate together at base (*Bombyliinae*).
- 7 (16). First posterior cell closed at end; metapleurae usually hairy.
- 8 (15). Hind border of the eyes absolutely entire; first posterior cell closed by the third longitudinal vein ending at costa; wings with a well-developed basal comb.
- 9 (12). First basal cell longer than the second.
- 10 (11). Three submarginal cells present . . . . . *Triplasius*, Loew.
- 11 (10). Two submarginal cells present . . . . . *Bombylius*, Loew.
- 12 (9). First basal cell not longer than the second.
- 13 (14). Face prominent and moderately pilose; discoidal cell as in the preceding genus . . . . . *Systoechus*, Loew.
- 14 (13). Face rounded and more densely pilose; discoidal cell very obtuse at end . . . . . *Anastoechus*, O.S.
- 15 (8). Hind border of the eyes with a deep sinuosity; first posterior cell closed by the fourth longitudinal vein ending at costa; basal comb small or wanting . . . . . *Eurycarenum*, Loew.
- 16 (7). First posterior cell open; wings with no distinct basal comb; metapleurae usually bare.
- 17 (18). Only two submarginal cells present . . . . . *Dischistus*, Loew.
- 18 (17). Three submarginal cells present.
- 19 (20). Third antennal joint quite bare above . . . . . *Adelidea*, Macq.
- 20 (19). Third antennal joint beset with long hairs above  
*Sosiomyia*, gen. nov.
- 21 (6). Abdomen narrow and cylindrical; antennae separated at base (*Cythercinae*) . . . . . *Oniromyia*, gen. nov.

- 22 (5). Tibiae bare or only pilose, destitute of spicules disposed in rows; but if the spicules are sometimes distinct, then the palpi are 2-jointed; body not bristly.
- 23 (32). Cubital fork very broad; if it is rather narrow, then the body is short and broad (*Uriinae*).
- 24 (29). Body very pilose; squamulae with a long fringe; plumula usually distinct; face provided with a more or less distinct circular brush.
- 25 (28). Proboscis long; third antennal joint dilated at end; facial brush well developed.
- 26 (27). First antennal joint more or less elongate, but always of a cylindrical shape; antennae placed near the upper border of the facial brush  
*Corsomyra*, Wied.
- 27 (26). First antennal joint short and swollen; antennae placed near the middle of the facial brush . . . . . *Callynthrophora*, Schin.
- 28 (25). Proboscis shorter than the mouth-opening; third antennal joint linear; facial brush less distinct; antennae placed near the upper border of the facial convexity . . . . . *Gnummia*, gen. nov.
- 29 (24). Body almost bare; squamulae with a short fringe or nearly bare; face destitute of circular brush.
- 30 (31). Antennae inserted near the mouth, with a thick third joint.  
*Hyperusia*, Bezzi.
- 31 (30). Antennae set far from the mouth, with a slender third joint; palpi long and thin . . . . . *Megapalpus*, Macq.
- 32 (23). Cubital fork narrow; if it is rather broad, then the body is narrow and elongate (*Phthiriinae*).
- 33 (40). Ambient vein complete.
- 34 (39). Four posterior cells present; palpi 2-jointed.
- 35 (36). Cubital fork broad; anal cell open; tibiae with three rows of distinct spicules . . . . . *Gonarthrus*, Bezzi.
- 36 (35). Cubital fork narrow; anal cell closed; tibiae without or with less distinct spicules.
- 37 (38). Face hairy; third antennal joint longer than the first; eyes of the male united . . . . . *Crocidium*, Loew.
- 38 (37). Face bare; third antennal joint shorter than the first; eyes of the male separate . . . . . *Apatomyra*, Wied.
- 39 (34). Three posterior cells only; palpi single-jointed; first antennal joint longer than the third . . . . . *Pseudoxmictus*, Big.
- 40 (33). Ambient vein incomplete, ending at apex of the anal vein.
- 41 (42). Four posterior cells present; discoidal cell complete; face bare; third antennal joint with a lateral stype apically; palpi single-jointed.  
*Phthiria*, Meig.
- 42 (41). Three posterior cells only.
- 43 (44). Discoidal cell closed; third antennal joint acute at end, with a terminal style; palpi single-jointed . . . . . *Geron*, Meig.
- 44 (43). Discoidal cell open; third antennal joint obtuse at end, with a lateral style; palpi 2-jointed . . . . . *Apolysis*, Loew.
- 45 (4). Metasternum exceedingly developed; hind legs very strong and long; eyes coalescing in both sexes or nearly so; body bare and narrow; wings and abdomen pedunculate (*Systropinae*) . . . *Systropus*, Wied.

- 46 (3). Prothorax much developed and beset with strong bristles (*Toxophorinae*) . . . . . *Toxophora*, Meig.
- 47 (2). Occiput prominent, bilobate above, with a central cavity, and with the fringe placed at the border of this cavity (*Cyleniinae*).
- 48 (53). Ocelli well developed; metapleurae bare.
- 49 (52). Second longitudinal vein not recurrent; first posterior cell open; three submarginal cells present.
- 50 (51). A marginal cell only . . . . . *Nomalonia*, Rond.
- 51 (50). Three marginal cells . . . . . *Henica*, Macq.
- 52 (49). Second longitudinal vein recurrent; first posterior cell closed; two submarginal cells . . . . . *Périnquemyia*, Big.
- 53 (48). Ocelli not distinct; metapleurae hairy . . . . . *Tomomyra*, Wied.
- 54 (1). Hind border of the eyes indented; eyes with a more or less distinct bisecting line; occiput always prominent and bilobate above.
- 55 (60). Origin of the second longitudinal vein beginning before the middle cross-vein, and usually at acute angles with it (*Lomatiinae*).
- 56 (59). Origin of the second longitudinal vein acute and distant from the middle cross-vein. \*
- 57 (58). Middle cross-vein placed much beyond the middle of the discoidal cell; eyes of the male separate; two submarginal cells.  
*Lomatia*, Meig.
- 58 (57). Middle cross-vein a little before the middle of the discoidal cell; eyes of male united; three submarginal cells . . . *Pteraulax*, gen. nov.
- 59 (56). Second longitudinal vein originating at an obtuse angle and rather near to the middle cross-vein . . . . . *Petrorossia*, Bezzi.
- 60 (55). Origin of the second longitudinal vein quite opposite to the middle cross-vein, or nearly so (but a little before it in the gen. *Synthesia*).
- 61 (64). Third antennal joint with a pencil of hairs at end; squamulae with hairy fringe; metapleurae bare (*Anthracinae*).
- 62 (63). Third antennal joint broader than the second, and with a produced margin; wings with a broad black pattern, and often dimidiate.  
*Anthrax*, Scop.
- 63 (62). Third antennal joint globular, inserted into the cup-shaped second joint and not broader; wings only with infuscated spots at cross-veins and bifurcations . . . . . *Spongostylum*, Macq.
- 64 (61). Third antennal joint without terminal pencil of hairs; squamulae with scaly fringe; metapleurae hairy (*Exoprosopinae*).
- 65 (72). Two submarginal cells only, or very rarely three; ocelli placed at vertex or nearly so; claws usually not toothed.
- 66 (71). Front tibiae beset with distinct spicules; proboscis short, retracted, with fleshy terminal flaps; third posterior cell long.
- 67 (70). Face rounded, not prominent, never very convex; second longitudinal vein originating quite opposite to the middle cross-vein; third antennal joint globular, quickly attenuated into a long, thin filiform style.
- 68 (69). Mouth-opening developed as usual, like the proboscis; facial plate short; thoracical macrochaetae well developed . . . *Villa*, Lioy.
- 69 (68). Mouth-opening very small, with the proboscis rudimentary; facial plate very long and broad; no thoracical macrochaetae.  
*Oestranthrax*, Bezzi.

- 70 (67). Face bluntly convex, rather prominent; second longitudinal vein originating before the middle cross-vein; third antennal joint gradually tapering into a not thin point; pulvilli well developed.  
*Synthesia*, gen. nov.
- 71 (66). Front tibiae smooth; proboscis projecting; face conically prominent or at least bluntly convex; third antennal joint cone-shaped; third posterior cell often short . . . . . *Thyridanthrax*, O.S.
- 72 (65). Three or four submarginal cells; ocellar tubercle far remote from the vertex; claws usually with a distinct basal tooth.
- 73 (76). Three submarginal cells only; claws with a long and acute basal tooth.
- 74 (75). Face rounded; proboscis longer than the oral cavity, usually very projecting; fore tibiae beset with spicules *Litorrhynchus*, Macq.
- 75 (74). Face mainly conical; proboscis shorter and less projecting; fore tibiae usually smooth . . . . . *Exoprosopa*, Macq.
- 76 (73). Four submarginal cells; claws with a short and obtuse tooth.  
*Hyperalonia*, Rond.

## FAMILY BOMBYLIIDAE.

### SUBFAMILY BOMBYLIINAE.

#### BOMBYLIUS, Linné.

Syst. Natur., ed. x, p. 228, 1758.

This genus is very abundantly represented in the South African Fauna. The genus *Triplasius*, as it was understood by its author in 1855 and 1860 (with the exclusion of the American species added subsequently), is evidently the same as *Bombylius*, being based only on the variable character of the three submarginal cells; at any rate the type-species *T. bivittatus* (which is wanting in the South African Museum collection) must be considered as congeneric with *B. lateralis*.

The very numerous South African species in the collection may be divided in the following traditional groups of higher value:

- 1 (6). Hind femora spinose at base; antennae approximate at base and with the first joint not thickened; wings with a more or less developed basal comb, often of very large size.
- 2 (5). Eyes of the male united; no strong bristles on head or on fore part of thorax; third antennal joint usually short, and not much attenuated at end; pulvilli more or less but always well developed; wings with small basal comb and with the discal cell usually more or less acute outwardly.
- 3 (4). Hairs of prevalent black colour, at least on abdomen; there are usually silvery spots of squamose hairs on head, thorax and abdomen . . . . . *ater* Group.

- 4 (3). Hairs mostly of yellowish or greyish colour, the black hairs on abdomen very scarce and limited to the sides or apex; no distinct silvery spots, or very rarely small ones on the frons alone. *minor* Group.
- 5 (2). Eyes of the male separated, head and fore part of thorax provided with strong bristles; third antennal joint long and very attenuate; pulvilli very small, almost wanting; wings with a broad basal comb and with the discoidal cell very obtuse outwardly, almost truncate. *micans* Group.
- 6 (1). Hind femora not spinose at base, with long hairs only; antennae rather distant at base, with the first joint distinctly thickened; wings with no distinct basal comb. *senex* Group.

(A) GROUP OF *B. ATER*.

In this group are included the species which have united eyes in the male and a narrow frons in the female, no strong bristles on the fore part of the thorax, and hind femora with strong bristles underneath near the base. They may be at once distinguished by the prevalent black colour of the dense furry pubescence under which are very distinct spots of silvery scales.

This group, however, is a very artificial one, and the following species may be divided at least in three natural series: (1) that of *B. lateralis*—that is to say, the gen. *Triplasius*; (2) that of *B. analis* (No. 2); and (3) that of *B. ornatus* (No. 3 to No. 7). The known South African species may be distinguished as follows:

- 1 (4). Thorax on each side with a broad and complete whitish stripe; frons of female with numerous, long and partly bristly hairs; wings with the basal comb long but formed by very thin bristles; they are blackish on the fore half, and hyaline with black spots on the posterior half; second longitudinal vein rather strongly looped at end.
- 2 (3). Three submarginal cells usually present; the dark spots on the hind half of wings more numerous and confluent. *bivilattus*, Loew.
- 3 (2). Only two submarginal cells present; hind half of wings with only four round and isolated dark spots. *lateralis*, Fabr.
- 4 (1). Thorax void of whitish lateral stripes; wings without isolated dark spots; second longitudinal vein less looped at end.
- 5 (10). The black patch at the base of the wings extending to the discal cross-vein; alula very long and narrow, black.
- 6 (7). Wings with the basal half equally black, the apical half hyaline; first posterior cell broad and briefly stalked; squamae provided with a silvery fringe; thorax with yellowish hairs in front. *argentatus*, Fabr.
- 7 (6). Wings with the basal black patch limited to the fore part, the anal and axillary cells being in part hyaline; first posterior cell narrow, and long-stalked; squamae with a black fringe; thorax with entirely black hairs in front.

- 8 (9). From the basal black part of wing springs an arched brown band, which is prolonged to the hind border along the sixth longitudinal vein . . . . . *delicatus*, Wied.
- 9 (8). Wings destitute of such a pattern . . . . . *mutilatus*, sp. n.
- 10 (5). The black pattern at the base of the wings very narrow, not extending over the basal cross-vein.
- 11 (18). Species of greater size (10–14 mm.), with rather short pubescence, chiefly in the female, which has, besides, the thorax densely clothed with white hairs; discal cross-vein never placed before the middle of the discoidal cell.
- 12 (17). Second longitudinal vein straight; discal cross-vein placed on or after the middle of the discoidal cell; basal comb strong.
- 13 (16). Body stout and broad, 12–14 mm. in length; wings with the black basal pattern more spread and extended over the alula; discal cross-vein after middle.
- 14 (15). Abdomen black-haired, with a tuft of white hairs at end. . . . . *analis*, Fabr.
- 15 (14). Abdomen with a row of fulvous spots along the middle line. . . . . *fulvonotatus*, Wied.
- 16 (13). Body slender and narrower, about 10 mm. in length; wings almost hyaline at base, darkened along the fore border to the end of the costal cell; discal cross-vein on middle . . . . . *acroleucus*, sp. n.
- 17 (12). Second longitudinal vein wavy; discal cross-vein on middle; basal comb small; hind femora less spinose; wings at base yellowish, with hyaline or whitish alula . . . . . *kilimandjaricus*, Speis.
- 18 (11). Species of smaller size, not reaching 10 mm. in length; pubescence longer, even in the female, the latter never densely white pilose on thorax; discal cross-vein always before the middle; wings with a very small basal comb.
- 19 (20). Abdomen with a conspicuous tuft of bright fulvous hairs on the central part of the sides . . . . . *furiosus*, Walk.
- 20 (19). Abdomen destitute of such tufts on the sides.
- 21 (22). Thorax and abdomen destitute of golden-coloured pubescence; face with the silvery hairs prevalent; second posterior cell usually broad at base and sessile . . . . . *ornatus*, Wied.
- 22 (21). Thorax and abdomen with distinct golden tomentum below the black hairs, more abundant in the female; face with the black hairs prevalent; second posterior cell very narrow at base and sometimes stalked . . . . . *rufiventris*, Macq.

## BOMBYLIUS LATERALIS, Fabricius.

Syst. Antl., 129, 3, 1805.

An isolated species, very like *bivittatus*, but on account of the bristles of the head and thorax making a passage to the group of *micans*; the eyes of the male are coalesced for a short distance, and the head has the shape of the species of the *B. micans* group.

A male from Howick, Natal; another male from Rondebosch (Cape), September, 1883, determined as *lateralis* by Bigot, and a female from the same locality. Of *B. (Triplasius) bivittatus*, Loew, I have received a male from Grahamstown (Cape).

*BOMBYLIUS BOMBIFORMIS*, Bezz. (ined).

Easily distinguished from the allies of *B. analis* on account of the broad, transverse band of orange hairs across the middle of the abdomen. Originally described from Rhodesia in my work on the Ethiopian Bombylidae of the British Museum, there is a ♂ specimen likewise from Rhodesia (Pemba), 1918 (Father Casset).

*BOMBYLIUS HAEMORRHOIDALIS*, sp. nov.

Almost the same as *B. analis*, Fabr., but distinguished in being of greater size, in having a bright fulvous (not white) terminal tuft on the abdomen, and in the discoidal cell of the wings being acute outwardly. Type ♂, from Mashonaland, Salisbury, 1894 (G. A. K. Marshall). Salisbury (March 20, 1914), R. Jack.

♂. Length of the body, 17 mm.; of the wing, 18 mm.; of wing-spread, 45 mm. Head, its appendages and its furry pile exactly as in *analis*; thorax, scutellum, squamulae and halteres likewise. The hairs at end of the abdomen have the same length and extension, but they are above and below of a bright fulvous colour, with golden sheen; in *analis* they are always of a pure white colour, or there are only some fulvous hairs at base of the tuft on the ventral side alone. Legs and wings as in *analis*; but the discoidal cell is acute at its distal end, touching in a point only the second posterior cell, which is thus almost stalked at base; in the very numerous specimens of *analis* which I have seen there is always a rather long cross-vein between the above-named cells. Besides, the distinct yellowish tint of the wings of *analis* is wanting in the present species.

*BOMBYLIUS ACROLEUCUS*, sp. nov., ♀.

Near *B. kilimandjaricus*, and I formerly considered it to be the female of that species; but the second longitudinal vein being straight it belongs to the group of *analis*, and is to be considered as a connecting link between this group and that of *ornatus*, on account of the elongated body and of the position of the discal cross-vein.

Type ♀, a single specimen from Van Wyk's Vlei (Cape).

Length of body, 9.5 mm.; expanse of wings, 25 mm. Head black, clothed with dense but short white hairs, with some bristly black hairs near the ocelli; occipital hairs short; antennae black, shaped as in  *analis* ; palpi black; proboscis black, 6 mm. long; shape and width of the frons as in  *analis* . Thorax black, clothed with dense and short white hairs, but having on the back three distinct longitudinal stripes of dark hairs; macrochaetae strong and long, black, but the longest end in a white point; mesopleural bristles well developed, white; pleurae and breast with hairs altogether white. Scutellum black, with black hairs and with long black bristles on hind border. Squamae brown, white-fringed; halteres black. Abdomen black and black-haired at base and on middle, with short white hairs on the sides, and at end with long hairs, black at base and white at end; venter with long greyish hairs. Legs entirely black and black-spinose; pulvilli yellowish; hind femora beneath with a complete row of 15-16 strong spines. Wings hyaline, narrowly blackened at the extreme base and distinctly yellowish-brown to the end of the costal cell at the fore border; alula grey, white-fringed behind; basal comb of middle size, black, with white hairs above. Wing-veins yellowish, but darkened outwardly; second longitudinal perfectly straight; first posterior cell broad and obtuse at end; discal cross-vein on the middle of the discoidal cell, which is rather obtuse outwardly, its external cross-vein being almost as long as the discal cross-vein; upper branch of the third vein very little retreating at base.

*BOMBYLIUS MUTILATUS*, sp. nov., ♂ and ♀.

Very like *B. delicatus*, but at once distinguished by the want of the arcuate brown band, which along the sixth longitudinal vein unites the brown of the base with the hind border of the wing.

Type ♂ and type ♀, and other specimens of both sexes, from Dunbrody, Uitenhage (Cape), December 19th and March 1st, 1912; Parys, Orange Free State; January, 1889; M'Fongosi, Zululand, March, 1911 (W. E. Jones).

Length of the body 4-6 mm. Head black and clothed with long black hairs; eyes of male coalescing for a long distance; frons of female broad, shining, with a dullish band above the base of the antennae; ocellar tubercle opaque black; both sexes have a small silvery spot outside the base of antenna, a cross-band of silvery hairs on the lower part of the face interrupted towards the middle, and a small round silvery spot in the middle of the occipital



border, near the eyes; the face is dull velvety black, with long and numerous black hairs; the beard is also black behind; proboscis a little shorter than the body. Antennae rather long and closely set at base; first joint with long black hairs; second joint globular; third joint a little longer than the first, not attenuate at end, with parallel sides, ending with a very minute style which is curved upwards. In the female there is a tuft of dark yellowish hairs on the upper part of the occiput, wanting in the male. Thorax entirely clothed with black hairs, even on the pleurae; there are silvery spots on the humeri, before the base of wings and in front of the scutellum; there is also the beginning of two longitudinal silvery stripes on the fore part of the thorax. Squamae and halteres black. Abdomen entirely black-haired, even on the venter; there is a row of silvery spots on each side, the spots on the fourth segment being broader than the others, and a median row of smaller silvery spots; there are no bristles on the hind borders of the segment, or only very thin and hair-like ones. Legs entirely black; hind femora with 4-6 strong bristles below; claws of male not much longer than those of the female. Wings with the discal cross-vein placed much before the middle of the discoidal cell; first posterior cell unusually narrow, blunt at end and long-stalked; second posterior cell with broad base; marginal cell with broad end; third posterior cell longer than broad; alula narrow and long, black. The pattern of the wings is as in *delicatus*, but with the difference above mentioned.

BOMBYLIUS KILIMANDJARICUS, Speiser (1910).

A male from Hex River, December 30th, named by Bigot i. litt. *B. nitidipunctatus*; another male from M'Fongosi, Zululand, March, 1911 (W. E. Jones); a female from Kimberley (Cape), November, 1913 (J. H. Power).

I am convinced that the present species is the *B. elegans* of Wiedemann on account of the fact that this author compares the species with *B. ambustus*, which is indeed very like; but as Loew has placed decisively *B. elegans* in the group of *micans*, I prefer to use the name under which Dr. Speiser has recently redescribed the species.

The hitherto undescribed female is very like *analis*, but is easily distinct in being smaller and in having the discal cross-vein placed on or very little after the middle of the discoidal cell; besides, the wings are not so intensively black at base, but only brownish; the hind antennal joint is shorter and less attenuate at end.

**BOMBYLIUS FURIOSUS, Walker (1860).**

A very distinct species on account of the bright orange tufts on the sides of the abdomen.

Originally described from Port Natal; there are some males from M'Fongosi, Zululand, December, 1911 (W. E. Jones), from Barberton, Transvaal (H. Edwards), and from Durban, Natal, April (J. H. Bowker).

**BOMBYLIUS ORNATUS, Wiedemann (1828).**

Easily distinguished by its smaller size and hyaline wings, which have the base only narrowly black.

Plettenberg Bay (Cape), June; Potchefstroom, Transvaal (T. Ayres); Dunbrody (Cape) (J. A. O'Neil); Estcourt, Natal (Haviland).

**BOMBYLIUS RUFIVENTRIS, Macquart (1846).**

Closely allied to the preceding species, but distinguished by the prevalent black hairs on the face, and by the reddish tomentum of thorax and abdomen.

Some specimens of both sexes from M'Fongosi, Zululand, December, 1911 (W. E. Jones); Durban, Natal (T. D. Butler); Lourenço Marques (Mozambique) (T. B. Paulus). Originally described from Port Natal.

Length of the body 5-7 mm. Previously mistaken by me for *ornatus*. On the face the black hairs are so prevalent that the cross-band of silvery hairs is much less distinct than in *ornatus*. Thorax and scutellum of male with only a less distinct scaly tomentum of golden colour, while in the female this tomentum is so dense that these parts appear to be entirely golden reddish; in addition in the female the hairs on the pleurae are yellow, not black. The scaly tomentum of the abdomen is well developed in the male, while in the female it is as dense as that of the thorax. On the wings the discoidal cell is very acute outwards, and therefore the base of the second posterior cell is pointed and often this cell is briefly stalked, while in *ornatus* the same cell is always sessile and usually broad at base.

The female of the present species is very like a small *Usia* in appearance.

**(B) GROUP OF B. MINOR.**

I have placed here a great number of species of medium and often of very small size, which were completely unknown to Loew at the

time he wrote his work on the Diptera of South Africa; only in 1863 did he describe some species belonging to this group.

They are characterised by the united eyes of the male, spinose hind femora, small basal comb and absence of bristles in front of the thorax; the hairs of the body are mostly or entirely yellow, and there are no silvery spots on the body; only very rarely are these spots present on the head alone.

Of the following species, only the first is different in many respects from the others, and, together with the two other species mentioned for comparison, forms a group allied to the Mediterranean *B. nubilus*. All the remaining species are very homogeneous, and constitute a peculiar group very characteristic of the South African fauna.

They may be tabulated as follows:

- 1 (6). Occipital hairs short; upper branch of the third longitudinal vein straight at base and in its whole length parallel with the costa or rarely very little retreating, the second marginal cell therefore as broad at base\* as at apex; antennae at base black-haired; proboscis entirely black; scutellum entirely black; legs always with black spines; discal cross-vein before the middle of the discoidal cell; wings infuscated at base and with a black comb.
- 2 (3). First posterior cell not acute at end; upper branch of the third longitudinal vein a little retreating at base, and usually provided there with a short stump; antennae and palpi entire black.  
*neithocris*, Jaenn.
- 3 (2). First posterior cell rather acute at end; upper branch at base not retreating and not appendiculated.
- 4 (5). Face of the male clothed with black hairs; abdomen at end with a broad tuft of white hairs; antennae and palpi red, the third antennal joint bright red . . . . . *erythrocerus*, Bezzi.
- 5 (4). Face of the male with dense yellow hairs; abdomen at end not broadly white-haired; antennae and palpi black. *mollis*, sp. nov.
- 6 (1). Occipital hairs long and dense, but without longer black bristles; upper branch of third longitudinal vein much retreating at base, and therefore the second submarginal cell is twice as broad at base as at end; antennae with pale hairs at base, and usually with red basal joints; proboscis often red—at least in part; scutellum usually red; legs with yellow spines; wings not infuscated at base, or only rarely pale yellowish, and with a yellow comb.
- 7 (12). Proboscis entirely red with a black end, or at least red on upper side; third antennal joint usually reddish; discal cross-vein placed much before the middle of the discoidal cell.
- 8 (11). Scutellum red; frons of female very broad; hairs of body of a moderate length; wings broadly reddish yellow at base; species of large size.

\* The base is that on the third vein, the end is that at the costa.

- 9 (10). First posterior cell broad and less attenuate outwardly; discoidal cell large; proboscis long; third antennal joint reddish; large size.  
*eurhinatus*, sp. nov.
- 10 (9). First posterior cell narrow and acute outwardly; discoidal cell very small; proboscis very short; third antennal joint black; smaller size . . . . . *brachyrrhynchus*, sp. nov.
- 11 (8). Scutellum greyish black, like the thorax; frons of female much narrower; hairs of body longer; wings entirely hyaline; proboscis short; species of smaller size . . . . . *globulus*, sp. nov.
- 12 (7). Proboscis entirely black, or only red on the under side; third antennal joint usually black; discal cross-vein placed on or a little after the middle of the discoidal cell.
- 13 (14). Antennae entirely black, but with whitish hairs on the base; palpi black; proboscis entirely black; femora broadly black at base, but with yellow spines; abdomen with rows of black hairs at the hind borders of the segments; great size . . . . . *impurus*, Loew.
- 14 (13). Antennae with red base or entirely red; palpi red; proboscis often red below; femora entirely yellow; abdomen without rows of black hairs; usually smaller.
- 15 (18). First posterior cell long and exceedingly attenuate outwardly, very acute, with a short stalk; second antennal joint red like the first.
- 16 (17). Abdomen broadly red on the sides and on the hind borders of the segments; hairs of body yellow; frons of female of usual width; third antennal joint short; first posterior cell with a short but distinct stalk; proboscis red below . . . . . *mundus*, Loew.
- 17 (16). Abdomen entirely greyish black, or only with a narrowly red hind border to the segments; hairs of body grey; frons of female distinctly broader; third antennal joint longer; first posterior cell very briefly stalked, almost sessile; proboscis entirely black.  
*sessilis*, sp. nov.
- 18 (15). First posterior cell of usual shape, blunt outwardly, with a long stalk; second antennal joint usually black like the third.
- 19 (20). Antennae entirely red; proboscis entirely black; scutellum without black border; abdomen entirely black with dense and equal yellowish hairs . . . . . *xanthocerus*, sp. nov.
- 20 (19). Antennae with the third joint black, and usually with the second also black.
- 21 (22). Scutellum with a broad black hind border; abdomen and proboscis entirely black . . . . . *marginellus*, sp. nov.
- 22 (21). Scutellum without black border.
- 23 (24). Very small species; proboscis black, or only dark red below; abdomen with yellow sides, end and hind border of segments red; hairs of body usually whitish . . . . . *paterculus*, Walk.
- 24 (23). Species of large size; proboscis red below, abdomen entirely black.
- 25 (26). Head and end of abdomen with yellowish hairs; face dark; small size . . . . . *fucatus*, sp. nov.
- 26 (25). Head and end of abdomen with white hairs; face yellow; large size . . . . . *ruficeps*, Macq.

*BOMBYLIUS MOLLIS*, sp. nov., ♂.

Very distinct from all the other species of the present group on account of the short hairs of the occiput and of the peculiar shape of the second submarginal cell.

Type ♂, a specimen from Salisbury (South Rhodesia), June, 1913; another badly preserved male specimen from Barberton, Transvaal (H. Edwards).

The present species is closely allied to the East African *neithocris* Jaenn. (*appendiculatus*, Bezzi) and *erythrocerus*, Bezzi (*rufoantennatus*, Beck). Length of body, 10 mm.; of proboscis, 6 mm. Eyes contiguous for a distance a little longer than the vertical triangle. Head black; vertical and frontal triangles black-haired, this last with some shorter yellow hairs on the sides. Face with dense yellow hairs, only beneath with a few black ones; occiput with short yellow hairs; the dense hairs of the underside of the head are more pale-coloured. The two basal joints of the antennae are wholly black and black-haired, the third is elongate and black, proboscis entirely black; palpi black, thin. Thorax and scutellum deep black, clothed with equal and entirely yellowish hairs, without any black hairs even on the pleurae; there are no distinct bristles. Squamae brown, halteres with whitish knob. Abdomen entirely deep black, without bristles, clothed with equal yellowish hairs like those on the thorax, but on the sides of the 2nd, 3rd and 4th segments there are tufts of black hairs. Legs yellow with black coxae, trochanters and tarsi; but the praetarsi are yellow; spines of the hind femora black.

Wings greyish, distinctly but very faintly infuscated at base to the second basal cell and to the discal cross-vein; comb very small, black; alula brownish, with whitish fringe behind; veins entirely black; marginal cell rather broad in the last part; first posterior cell very acute outwardly and briefly stalked; discal cross-vein a little before the middle of the discoidal cell; the cross-vein dividing the discoidal cell from the second posterior cell is very short, and therefore the discoidal cell is rather acute outwardly.

*BOMBYLIUS DISJUNCTUS*, Bezzi.

Near *B. mollis*, but very distinct from it and from all the other species here recorded on account of the separated eyes of the male.

The species seems to be widely spread throughout the whole Ethiopian region, from Abyssinia to Natal; there is a male specimen from Salisbury, April 24th, 1917.

*BOMBYLIUS EURHINATUS*, sp. nov., ♀.

Easily distinguished by the long and red proboscis, by the red antennae, scutellum and legs, and by the wings being brownish along the fore border near the base.

Type ♀ and another specimen from Namaqualand, O'Okiep (Cape), the smaller one labelled by Bigot with the MS. name which I have retained for the species; another ♀ from Namaqualand, Springbok (Cape), November, 1890 (R. M. Lightfoot). Length of body 8–12 mm.; of proboscis, 6–10 mm. Entirely clothed with fulvous hairs of moderate length, the bristles of body and legs being also entirely yellow. Head yellowish, with black, grey-dusted occiput; frons very broad. Face produced; antennae entirely yellow, approximate at base, with the third joint narrow, long, gradually attenuate, with a very short terminal style; hairs of the occiput dense and rather long, of a pale yellowish colour, those of frons, face and base of antennae short and more yellowish. Palpi yellow; proboscis about as long as the body, red above and below, with a black tip. Thorax entirely dull black, clothed with dense fulvous hairs, and provided with yellow bristles before and behind the base of wings; pleurae without any black hair. Scutellum red, narrowly black at base, clothed with hairs like those of the thorax and with a row of yellow bristles at the hind border. Squamae and halteres yellowish. Abdomen entirely black, clothed with fulvous hairs with rows of thin, yellow bristles at the hind border of the segments; venter black, with only the hind border of segments yellow. Legs entirely yellow, whitish-dusted, with yellow bristles, those of the hind femora well developed and numerous. Wings with the basal infuscation extending to the second basal cell and to the end of the first longitudinal vein; marginal cell broad at end; second submarginal cell at base twice as broad; first posterior cell broad and not attenuate outwardly; discal cross-vein situated much before the middle of the discoidal cell; this cell is broadly obtuse outwardly and much longer than the second posterior cell, which has a broad base. Alula with a very short fringe, like that of the hind border of wings; basal comb rather long and yellow. Veins and costa yellow, the first vein red but black at end; ambient vein black.

*BOMBYLIUS BRACHYRRHYNCHUS*, sp. nov., ♀.

Allied to the preceding, but distinct by its smaller size, by the very short proboscis, by the shape of the first posterior cell, and by the colour of the antennae. The species is also allied with *mundus* and

*sessilis*, being, however, distinct owing to the basal infuscation of the wings, the red upper side of the proboscis, and from the first by the much broader frons of the female.

Type ♀ and another specimen of the same sex from Bushmanland, Jackal's Water (Cape), October, 1911 (R. M. Lightfoot).

Length of the body 7-7.5 mm.; of the proboscis 3 mm.

Head as in the preceding; third antennal joint black, and distinctly shorter; proboscis strong, red above, but black at end and below, the base excepted, which is dark red; the proboscis is besides much shorter, being hardly longer than the thorax. Thorax and scutellum as in the preceding. Abdomen black, narrowly red on the sides and with the venter altogether red; towards the end there are very long and white bristly hairs, which are entirely wanting in *eurhinatus*. Legs as in the preceding. Wings with the basal infuscation more blackish than reddish and limited to the second basal cell; first posterior cell very narrow, long and acute, but less than in *mundus*; discoidal cell very small, as long as the second posterior cell.

BOMBYLIUS GLOBULUS, sp. nov., ♀.

A very small species of globular shape, distinct by the long hairs of body, by the red antennae, proboscis and legs, by the black scutellum (an aberrant character in the present group), by the very narrow frons of the female and by the entirely hyaline wings.

Type ♀, and another specimen of the same sex from Namaqualand, O'Okiep (Cape), September, 1890 (R. M. Lightfoot).

Length of the body 5 mm.; of the proboscis 1.5-2 mm. Body entirely black, and entirely clothed with long yellowish hairs, without any black hair. Frons very narrow, about half as broad as in the two preceding species; antennae entirely pale yellow, provided at base with long hairs, with the third joint rather thick and pointed, ending with a style longer than that of the two preceding species; proboscis short and strong, red, with a black tip. Thorax clothed with long, pale yellowish and shiny sericeous hairs, which are almost whitish on the lower part of the pleurae; there are no distinct bristles. Scutellum entirely black, haired like the thorax. Abdomen entirely black, but red on the venter; it is hairy like the thorax; the bristles at the hind border of the segments are thin and hardly distinguishable between the hairs. Legs entirely yellowish, and with yellowish bristles, those on the femora well developed. Wings quite hyaline, with yellow veins which are darkened at end; basal comb very small; marginal cell also very broad, the upper branch of the cubital fork being very strongly

curved at base; discal cross-vein situated much before the middle of the discoidal cell; first posterior cell rather broad, not pointed, and very long stalked; discoidal cell rather small, but longer than the second posterior cell, which is broader than long.

*BOMBYLIUS IMPURUS*, Loew (1863).

A single male specimen from Bushmanland, Jackal's Water (Cape), October, 1911 (R. M. Lightfoot).

A well-marked species characterised by the numerous black bristles at the hind border of the abdominal segments, by the entirely black antennae, by the black base of the femora and by the red scutellum. The palpi are dark brownish; the proboscis is entirely black and rather long, measuring 8 mm., with a length of body of 14 mm. Bristles of legs entirely yellow, those on the hind femora numerous and well developed. Abdomen entirely black. The long bristles of the thorax are of a dark yellowish colour. Wings with a rather long and yellow basal comb; veins yellow, black outwardly; marginal cell broad at base; second submarginal twice as broad at base as at end; first posterior cell broad and short, obtuse, long-stalked. Discal cross-vein after the middle of the discoidal cell; this last cell broad, obtuse at end, much longer than the second posterior cell, which is broader than long; alula very briefly fringed. Halteres with whitish knob.

*BOMBYLIUS MUNDUS*, Loew (1863).

I refer to this species, of which Loew has described the female only from Bloemfontein, some specimens which agree very well with his description. Length 8-10 mm., but the proboscis is only 4-5 mm. long, and therefore not *corpori subaequalis* as stated in the description.

Some specimens of both sexes from Bushmanland, Jackal's Water (Cape), October, 1911 (R. M. Lightfoot); a female from O'Okiep, October, 1885, labelled by Bigot *B. picticornis*, MS. I think that the *B. flavus* of Macquart may prove to be the same species. I have assumed as principal character of the present species the acute form of the first posterior cell, the sides of which are stalked; marginal cell broad at end; upper branch of the cubital fork not much bent at base, but the second submarginal cell always twice as broad at base as at end; discal cross-vein after the middle of the discoidal cell, which is very broad, but longer than the second posterior cell; this cell very broad at base. Basal comb yellow, short. The proboscis is entirely black above, but red below. Eyes of male contiguous for a short



space, but there is a very thin white stripe between them; frons of female comparatively narrow. The hairs of the occiput are dense and shorter than in the allied species. Squamae yellowish, white-fringed; halteres white. All the bristles of thorax and abdomen are concealed between the hairs and concolorous with them. Hind femora with numerous yellow spines. Claws of the female not longer than those of the male.

*BOMBYLIUS SESSILIS*, sp. nov., ♀.

Very nearly allied to the preceding, but distinct by the entirely black proboscis, by the much broader frons of the female and by the more pointed first posterior cell.

Type ♀, a single specimen from Bushmanland, Henkries (Cape), October, 1911 (R. M. Lightfoot).

Length of the body 8 mm., of the proboscis 4 mm. Hairs of body rather short, those on frons and face yellowish, on occiput and thorax pale greyish, on the sides almost whitish; there are no black hairs or black bristles. Palpi yellow; proboscis stout, black above and below. Thorax entirely greyish black; scutellum red, with a black base. Squamae and halteres whitish. Abdomen black, the hind border of the segments and the venter reddish. Legs entirely yellow, with the two last tarsal joints black; hind femora with 7-8 strong, yellow spines; claws of female short. Wings entirely hyaline; the veins are disposed as in the preceding species, but the first posterior cell is so pointed and so prolonged to the hind border that it is almost without a stalk.

*BOMBYLIUS XANTHOCERUS*, sp. nov., ♂.

Very closely allied to *mundus*, but distinct on account of the entirely red antennae, entirely black proboscis, longer occipital hairs, entirely black abdomen and the obtuse and long-stalked first posterior cell.

Type ♂, a single specimen from Bushmanland, Een Riet (Cape), October, 1911 (R. M. Lightfoot).

Head as in *mundus*, but the hairs of the occipital border are about twice as long; third antennal joint red like the others, with a hardly distinct terminal style; palpi yellow; proboscis black above and below. Hairs of thorax and abdomen rather long and dense, entirely yellow, like the less distinct bristles, and a little paler on the pleurae. Scutellum red, narrowly black at base. Abdomen entirely black, even on the venter, with the genitalia red. Halteres with a white knob. Legs entirely yellow, the last joints of the tarsi black; hind femora

with 7-8 strong and yellow bristles. Wings wholly hyaline; the veins as in *mundus*, but the discal cross-vein placed exactly on the centre of the discoidal cell, and the first posterior cell obtuse at end, with a long stalk.

*BOMBYLIUS MARGINELLUS*, sp. nov., ♀.

Like the preceding, but distinct owing to the black third antennal joint and by the scutellum margined with black.

Type ♀, a single specimen from Matjesfontein (Cape), September, 1896 (W. F. Purcell).

Length of body 8 mm.; of proboscis 4 mm. Head as in *mundus*, with entirely yellow hairs, those on the hind border of the occiput very long; first antennal joint dark yellowish and with yellow hairs, second blackish, third black, long, with a very short and thin style. Palpi dark brown; proboscis entirely black; frons as broad as in the female of *mundus*. Thorax and abdomen with wholly pale yellowish hairs; the bristles are hidden between the hairs. Scutellum red, with a black base and a broad black border. Halteres with a white knob. Abdomen entirely black, even on the venter. Legs yellow, with the two last tarsal joints black; claws short; hind femora with 6-7 very long and strong yellow bristles. Wings hyaline, a little dark yellowish at base and along the costal cells; basal comb yellow; veins as in *mundus*, but the first posterior cell short, obtuse, with a long stalk; the discal cross-vein is placed a little after the middle of the discoidal cell, and the fourth longitudinal vein is strongly curved below after that cross-vein; the discoidal cell therefore is less obtuse at the end than in the other species.

*BOMBYLIUS PATERCULUS*, Walker (1852).

Distinct owing to its smaller size, dark pubescence, and yellow hind borders of the abdominal segments.

A single female example from Bushmanland (Cape), Jackal's Water, October, 1911 (R. M. Lightfoot).

Head as in *mundus*; second antennal joint black like the third; proboscis dark red below, 3 mm. long, while the length of body is 7.5 mm.; occipital hairs long. Scutellum red, with black base. Abdomen black, sides, venter and narrow hind borders of segments red. Legs as in the preceding, the hind femora with five long, yellow bristles. Wings as in *mundus*, entirely hyaline, with the first posterior cell short and long stalked.

BOMBYLIUS RUFICEPS, Macquart (1840).

Dipt. Exot. ii, 1840, pl. vii, fig. 5.

A species distinguishable by its greater size (length of body 12 mm., of proboscis 5 mm.), red underside of proboscis and entirely black abdomen.

A single male specimen from Bushmanland, Jackal's Water (Cape), October, 1911 (R. M. Lightfoot).

Face yellow; second and third antennal joint black; palpi yellow; occipital hairs long and shining white. Hairs of body dense and entirely yellowish. Scutellum red, with black base. Abdomen entirely black, even on the venter; its apical half clothed with whitish hairs. Legs yellow, the two apical joints of the tarsi black; hind femora with numerous yellow bristles. Wings distinctly yellowish at base and fore border; veins as in *mundus*, but first posterior cell short and long-stalked. Discoidal cell broad and very obtuse outwardly.

It is interesting to note that in the same place and time are found together numerous species of the present very homogeneous group, viz. *brachyrrhynchus*, *impurus*, *mundus*, *sessilis*, *xanthocerus*, *paterculus*, and *ruficeps*. In the European Fauna a similar fact is often to be observed in the species of the allied group *minor*.

(C) GROUP OF B. MICANS.

This group has been well characterised by Loew in his work on the South African Fauna, together with the statement that it is the most abundant in species at the Cape and that the distinction of the species is a very difficult one. But Loew has known only species with a brown fore border on the wings, like *micans*; there is, however, a long series of species with entirely hyaline wings, and another with spotted wings. These last species have nothing to do with the group *medius*, as those with a dark fore border have nothing to do with the group *major*.

The principal features of the group are as follows: Eyes of male separated; head with strong bristles on frons, and usually on the genae also; antennae with the first joint not thickened, and the third very long and thin; thorax with very strong bristles in front, on the shoulders; hind femora provided below with very long and strong bristles, even near the base; pulvilli very short, much shorter than the claws; wings with a very large basal comb, formed by strong bristles; discoidal cell very obtuse at end, the vein dividing it from the second posterior cell being rather long; discal cross-vein usually placed after the middle, and often on the last third of the discoidal cell; upper branch of the cubital fork much retreating at base.

The numerous species in the collection, with the addition of others before me, may be distinguished with the aid of the following table:

- 1 (24). Scutellum black; bristles on the genae always present; wings with an extended pattern consisting of a brown fore-border or of some broad dark spots.
- 2 (11). Wings with a dark fore border, provided with more or less distinct darker spots, but without any distinct broad brown spot on the hind half; bristles of the genae entirely yellow, or rarely with a few black ones intermingled; bristles of abdomen entirely yellow; thorax usually with three distinct longitudinal stripes (*micans* group).
- 3 (6). Wings with a red or yellow basal comb; femora entirely yellow.
- 4 (5). All the bristles of the body are of a bright purple-red colour, even those of the basal comb; wings with a reddish fore border.  
*purpureus*, sp. nov.
- 5 (4). All the bristles yellow, even those of the comb; fore border of wings brownish-yellow as usually . . . . . *micans*, Fahr.
- 6 (3). Wings with a black comb; femora black towards the base.
- 7 (10). Spines of the legs of a yellow colour; bristles of the genae entirely yellow; thoracical stripes of the female distinct; infuscation of the cross-veins into the dark fore border of wings not spot-like.
- 8 (9). Second and third posterior cells short, distinctly broader than long; species of greater size . . . . . *hypoleucus*, Wied.
- 9 (8). The above-named cells are long, longer than broad or as long as broad; smaller size . . . . . *hirtus*, Loew.
- 10 (7). Spines of the legs entirely black; genae with a few black bristles between the yellow ones; thorax of female not distinctly striped; infuscations into the dark fore border broader and spot-like.  
*servillei*, Macq.
- 11 (2). Wings with broad, isolated dark spots on the hind half, the dark fore border being more or less developed or wanting, basal comb always black, genae with wholly black bristles, or rarely with a few yellow ones intermingled, abdominal bristles black or yellow (*capensis* group).
- 12 (21). Legs with black spines; peristomial comb usually black; abdominal bristles usually black and distinctly longer than the hairs.
- 13 (20). Marginal cell entirely filled with brown, with or without hyaline spots at end.
- 14 (19). Marginal cell with two broad hyaline spots at end; abdomen with the usual strong black bristles.
- 15 (18). Along the hind border of the wings there are brown spots on the last segments of the longitudinal veins; anal cell with a brown spot at apex.
- 16 (17). Brown spots at end of the veins on the hind border very small and isolated; anal cell with a small dot at apex, species of greater size.  
*capensis*, Loew.
- 17 (16). Brown spots of the hind border very broad and united with those on the discoidal cell; anal cell at end with a very broad spot; species of middle size . . . . . *megaspilus*, sp. nov.

- 18 (15). No spots along the hind border and at end of the anal cell; smaller size . . . . . *braunsi*, sp. nov.
- 19 (14). Marginal cell entirely brown, without hyaline spot at end; no spots on the hind border, nor at end of small cell; abdominal bristles dark yellow; species of very small size . . . *punctatellus*, sp. nov.
- 20 (13). Marginal cell broadly hyaline at end . . . *punctifer*, sp. nov.
- 21 (12). Spines of the legs dark yellow; abdominal bristles yellow, and hardly longer than the hairs; peristomial comb yellow, or rarely black in part.
- 22 (23). Marginal cell filled with brown to the end; the cross-vein between the discoidal and the second posterior cell is not margined with brown . . . . . *pentaspilus*, sp. nov.
- 23 (22). Marginal cell entirely hyaline; the above-named cross-vein is margined with brown . . . . . *obesus*, sp. nov.
- 24 (1). Scutellum red; bristles of the genae often wanting; basal comb of the wings usually yellow or white; wings entirely hyaline, mainly without any dark pattern, or with a light yellowish tint near the base and along the fore border, or with very small and less distinct fuscous spots on the cross-veins.
- 25 (28). Genae with some strong yellow bristles, which form the usual peristomial comb of all the preceding species; body mainly yellow-haired.
- 26 (27). Scutellum entirely red behind; discoidal cell without a prominent angle below . . . . . *spinibarbus*, sp. nov.
- 27 (26). Scutellum with a black hind border; discoidal cell with a prominent angle inwards, and there provided with a stump. *angulosus*, sp. nov.
- 28 (25). Genae without distinct bristles, but if they are rarely distinct, the body is mostly white-haired.
- 29 (34). Frons of female of the usual moderate breadth; wings usually not punctate.
- 30 (31). Scutellum with a broad black hind border; wings rather infuscated and punctate, with a black basal comb . . . *nigripecten*, sp. nov.
- 31 (30). Scutellum without black hind border; wings with a yellow or white basal comb.
- 32 (33). Discal cross-vein before the middle of the discoidal cell; wings lightly infuscated at base; thorax of male with brown hairs. . . . . *peringueyi*, sp. nov.
- 33 (32). Discal cross-vein on the middle; wings entirely hyaline, even at base; thorax of male white-haired . . . *argentifer*, Walk.
- 34 (29). Frons of female twice as broad as usual; wings hyaline, punctate, with the discal cross-vein before the middle of the discoidal cell. . . . . *molitor*, Wied.

BOMBYLIUS PURPUREUS, sp. nov., ♂, ♀.

Closely allied to *micans*, but distinct by the bright purple colour of the macrochaetae of the comb and of the thoracical stripes, and also by the more reddish fore border of the wings.

Type ♂ from Klipfontein, Namaqualand (Cape), August, 1890

(R. M. Lightfoot), and type ♀ from Namaqualand, August, 1873 (R. Trimen).

Length of body 12–13 mm., of proboscis 4–4.5 mm. Body yellow-haired, but here and there with purple-coloured macrochaetae. Frons of male broad, that of female twice as broad, but only of usual width; the hairs are yellow, white below, with only a few black hairs on the underside of the first antennal joint; on the upper part of occiput and on the sides of frons and face there are bristles of a bright red colour, chiefly in the female; the peristomial comb is well developed, and of a purple red colour. Antennae black, the third joint narrowly yellowish at base, elongate and very thin, with a short style; the first joint is not thickened, and is provided with long and numerous yellow and red hairs, with a few black ones at the underside. Proboscis black, rather short; palpi black; the hairs of the occipital border are short, but above near the vertex they are very dense and long. Thorax clothed with pale yellowish shining hairs, which on the lower part of the pleurae are whitish. The three longitudinal stripes of red hairs on the back are well developed in both sexes; there are long and strong bristles of a purple colour in front, in the notopleural region and on the breast; the metapleural tuft is formed by yellow hairs and red bristles. Scutellum entirely black like the thorax, clothed with yellow hairs and provided with strong bristles of purple colour at the hind border. Halteres yellow with a red stalk; squamae dark, with a reddish fringe. Abdomen black, clothed with long and shining yellow hairs, which are depressed to form a tuft in the female; on the sides there are tufts of black hairs, which, however, are almost wholly hidden between the yellow hairs; the bristles are long and strong, much longer than the hairs, chiefly those on the last segments; in the male they are more yellow, in the female more purple and coloured like those of the thorax. Venter black, with short reddish-yellow hairs. Legs entirely yellow, whitish-dusted, with yellow spines, those of the hind femora very long and strong, numerous, 8–10 on the lower row; claws long, black, with reddish base; pulvilli very short in both sexes. Wings hyaline; the fore border to the basal cells and to the last fifth part of the marginal cell is of a reddish-brown colour; basal comb strong, with purple bristles, yellow hairs above and a very conspicuous tuft of whitish hair also above near the base. The veins are red at base and brown at end; marginal cell with broad end; upper branch of cubital fork very retreating, the second submarginal cell being, therefore, three times as broad at base as at end; first posterior cell about of equal width throughout with parallel sides; broad, obtuse at end and

long-stalked; discoidal cell very broad at end, the vein between it and the second posterior cell being of unusual length, with the sides about parallel; discal cross-vein perpendicular, placed after the middle of the discoidal cell; anal cell broadly open; alula opaque, brownish-yellow, with a short yellowish fringe.

**BOMBYLIUS MICANS, Fabricius (1798).**

This species may be at once distinguished from all the others here recorded on account of its yellow alar comb and of the yellow femora. A single couple from Darling (Cape), 1905 (L. Péringuey).

It answers very well to Loew's description, but all the hairs and bristles of the head are without any exception yellow or whitish. The tuft of yellow bristles on the genae, or peristomial comb, is well developed.

**BOMBYLIUS HYPOLEUCUS, Wiedemann (1821).**

A species easily distinguished by the greater size and the short and broad second and third posterior cells.

There are numerous specimens of both sexes, answering to Loew's description: Namaqualand, O'Okiep (Cape), September–October, 1890 (R. M. Lightfoot); Stellenbosch, 1887, and Darling (Cape), 1905 (L. Péringuey); Bushmanland, Henkries (Cape), October, 1911 (R. M. Lightfoot); Giftsberg, Van Rhynsdorp (Cape), September, 1911. One of these specimens was labelled by Bigot, "*B. stylicornis*, Macq.," wrongly, as this last species is undoubtedly a *Systoechus*, and is perhaps the same as *S. mixtus*, as shown by fig. 2, pl. vii, of Macquart.

**BOMBYLIUS HIRTUS, Loew (1860).**

Closely allied to the preceding, but distinct by its smaller size and by the different shape of the posterior cells of the wings.

Some specimens of both sexes from Darling (Cape), 1905 (L. Péringuey); Matjesfontein (Cape), September, 1896 (W. F. Purcell); Namaqualand, O'Okiep (Cape), September, 1893 (R. M. Lightfoot).

**BOMBYLIUS SERVILLEI, Macquart (1840).**

Very distinct from all the foregoing species owing to the black spines of the legs; in this character, and in the almost spotted wings and in the partly black bristles of the peristomial comb the present species is a connecting link with the following *capensis* group.

Two female specimens from Fraserburg (Cape), April–June, 1885, determined by Bigot as *servillei* and answering very well to the original description.

*BOMBYLIUS CAPENSIS*, Linné (1767).

I refer to this species, which has never been recorded again from the time of the earlier authors, a single female specimen from Namaqualand, O'Okiep (Cape), September, 1890 (R. M. Lightfoot). It is 12 mm. long, with 30 mm. of wing expanse. It is wholly clothed with long, sericeous, whitish hairs, with long black bristles between them; the abdomen shows tufts of black hairs on the sides and at ends. The bristles of frons, face and genae are black, but on the occiput there are some yellow bristles. Proboscis black, 6 mm. long. Bristles in front of thorax numerous and strong, black, with a few yellow ones inwards. Femora black; tibiae yellow, with black spines. The wings are blackened at the base and along the marginal cell, which shows at end two broad hyaline spots, one after the other; there are broad, rounded fuscous spots at the end of the second basal cell, on the discal cross-vein and at the base of the second submarginal cell; other smaller spots are seen at the base of the third posterior cell and at the end of the discoidal and of the first posterior cell; much smaller and less distinct spots are on the ends of the veins along the hind border. Discoidal cell very long and obtuse; the discal cross-vein is situated after its middle; upper branch of the third vein very bent.

*BOMBYLIUS MEGASPILUS*, sp. nov., ♂, ♀.

Closely allied to the preceding species, but smaller, and distinct owing to the very broad black spots at hind border of the wings.

Type male from Giftsberg, Van Rhynsdorp (Cape), September, 1911; type female from Touw's River, Cape (W. F. Purcell).

Length of body 9-10 mm.; of proboscis 4-5 mm. Head black. Frons of the female three times as broad as that of the male; the hairs are white, but the bristles are black and very long, chiefly in the female; hairs and bristles of the occipital border long, at least near the vertex. Antennae black, the first joint with numerous and long black hairs; third joint very thin, entirely linear. Proboscis black; palpi black; peristomial comb strong. Thorax and scutellum entirely black; the thorax with greyish hairs and three less distinct longitudinal stripes of yellowish hairs; pleurae with white and yellowish hairs, bristles of the sides long and black, but those on the hind border of the scutellum are dark yellowish. Squamae dark; metapleural tuft black and some white hairs below the squamae; halteres blackish-brown, with a whitish spot on the knob. Abdomen black, clothed with long hairs, which are in part silky-white, but are mostly black; after the middle of the abdomen the hairs are directed behind, forming



a tuft; the bristles are longer than the hairs, black, but those of the hind half are mainly yellow. Venter white-dusted and white-haired in the middle, the sides with long and dense yellow bristly hairs, which are strikingly noticeable between the black pubescence. Legs with strong, black spines, those of the hind femora numbering 5-7, and very long; femora black, white-scaled; tibiae yellow; tarsi black with yellowish base. Claws of the male very long, black; claws of the female more than one-half shorter than those of the male; pulvilli dark, linear. Wings with the upper branch of the cubital fork thoroughly curved near the base; first posterior cell short, narrow and rather obtuse at end; discoidal cell broad and obtuse; second and third posterior cells short and broad; discal cross-vein placed after the middle of the discoidal cell. Veins black. Base and marginal cell blackened, but the latter with two hyaline spots at end; black spots placed as in *capensis* and likewise broad, but those at the base of the second and third posterior cells much broader, and united with the spots on the ends of the veins in the shape of a single angular spot; at the end of the anal cell there is a very broad spot, which is united with the one at the end of the second basal cell.

*BOMBYLIUS BRAUNSI*, sp. nov.

Allied to the preceding, but distinct by its smaller size, and in wanting the brown spots at the hind border of wings.

This species was found near Willowmore (Cape) by Dr. Brauns, and will be described by me in a forthcoming paper on the African Bombyliidae of the Hungarian Museum.

*BOMBYLIUS PUNCTATELLUS*, sp. nov., ♂.

Allied to the three preceding species, but distinct, being the smallest of all, and having the marginal cell completely filled with brown to the end, without any hyaline spot.

Type ♂, an example from the Cape without special locality.

Length of body 6 mm.; wing expanse 13 mm. Head black; the eyes are more widely separated than in the other males; hairs long and whitish, those on the occiput rather long; bristles long and black, but those of the peristomial comb yellowish. Proboscis black, 2.5 mm. long; third antennal joint linear, with a rather long terminal style. Thorax and scutellum entirely black, with long yellowish hairs and very long, dark yellow bristles. Abdomen black, with dark yellow hairs on sides and at end with partly black hairs; bristles longer than the hairs and yellow. Legs yellow, black-spinose; femora dark,

white-scaled; tarsi blackish at end; hind femora with some long spines underneath; claws black, very long. Wings with black and long basal comb; upper branch of the cubital fork retreating at base; first posterior and discoidal cell very short, discal cross-vein set after the middle of the discoidal cell; anal cell closed at end. Wing pattern as in *capensis*, but no hyaline spots at end of the marginal cell and no brown spots along the hind border. There is a second male specimen in which the hairs of body are shiny white instead of yellowish, and the peristomial bristles are black; the bristles in the fore part of the thorax are black; the anal cell is broadly open.

BOMBYLIUS PUNCTIFER, sp. nov., ♀.

Distinct from the other species with punctate wings and with black spinose legs, owing to the marginal cell being hyaline at end; it is perhaps referred by Macquart to the varieties of his *B. servillei*.

Type ♀, and an additional specimen of same sex from Namaqualand, O'Okiep (Cape), September, 1890 (R. M. Lightfoot).

Length of body 10–11 mm. Head black; the eyes are moderately separated for a female; hairs white, the bristles long and all black, except a few yellowish ones at vertex. Third antennal joint linear, with a very short style; proboscis black, 3.5 mm. long. Thorax and scutellum black, clothed with whitish, sericeous hairs; thoracical bristles yellow, only a black tuft before the root of the wings and a few in front; scutellum margined with yellow bristles. Squamae dark, fringed with long, silvery hairs; halteres blackish. Abdomen black, clothed with hairs like those of the thorax, with only a few black hairs towards the end underneath; bristles black and longer than the hairs, which are tuft-like at end. Legs yellow, with black, white-scaled femora and black-ended tarsi; the spines are black, and very strong and long, chiefly those on the hind tibiae; hind femora with 5–6 spines underneath; claws short, black. Wings with a long-stalked first posterior cell and very obtuse and short discoidal cell; discal cross-vein a little after the middle of the discoidal cell. Basal comb strong, black; costal vein white-scaled to the end of the first vein. The wings are very little infuscated towards the base and along the fore border; the marginal cell is entirely hyaline after the end of the first vein; the greater brown spots are on the discal cross-vein and on the base of the upper branch of the cubital fork; the medium-sized spots are on the cross-veins closing outwardly the second basal and the discoidal cells; the smallest ones are on the base of the third posterior cell and at the end of the first posterior cell; these two

last spots are sometimes very faintly distinct, but there are no other spots besides the six above described.

*BOMBYLIUS PENTASPILUS*, sp. nov., ♂.

Distinct from the other species on account of the yellow peristomial comb and of the yellow spines on the legs. Wings blackened along the fore border.

Type ♂, from Dunbrody, Uitenhage (Cape), May, 1900 (J. A. O'Neil). Length of body 11–13 mm. Head black, with whitish hairs, those of the hind border long; bristles black, but those of the peristomial comb yellow, with a few black ones intermingled; antennae black, with the third joint linear; proboscis black, 4–5 mm. long. Thorax and scutellum black, with dense whitish sericeous hairs; bristles yellow, but black on the notopleural line and before the root of the wings; those on the hind border of the scutellum are yellow. Squamae dark brown, white-fringed; halteres blackish. Abdomen clothed with hairs like those of the thorax and with yellow bristles; there are black hairs below at end and on the sides; the pubescence at the apex is tuft-like. Legs black, with yellow spines, even those of the hind femora; claws black, long. Wings with black basal comb and with white-scaled costa; first posterior cell with a long stalk; discoidal cell broad at end, the discal cross-vein set a little after its middle. Wings with the base and the fore border broadly infusate to the end of the marginal cell, which has no hyaline spots at apex; the three greater brown spots at the end of basal cell and at the base of the second submarginal cell are in contact with the dark fore border, and they are therefore much less striking; the two smaller spots are at the end of the first and at the base of the third posterior cells.

*BOMBYLIUS OBESUS*, sp. nov., ♂, ♀.

Of this species of greater size I have two specimens in my own collection, collected by Dr. Brauns at Willowmore (Cape) in August, 1906. It is distinguished from the preceding by the hyaline marginal cell and by the infuscated cross-vein at end of the discoidal cell. A female specimen from Isipingo (Natal) in the collection has a black peristomial comb. Head black; frons of male broader than usual, and that of the female twice as broad; hairs long, greyish or white; bristles black, but those on the occiput yellowish, chiefly in the female; bristles of the peristomial comb yellow above and black beneath. Antennae black, with long black hairs at base; third joint linear, styliform; proboscis black, 5.5–6 mm. long. Thorax and

scutellum black, clothed with long and dense yellowish-grey hairs, which, seen from the front, are shining white; on the back there are three less distinct, dark, longitudinal stripes, more developed in the female; all the bristles are yellow, but along the notopleural line there are a few black ones. Squamae brown, white fringed, with yellow bristles. Abdomen clothed with hairs like those of the thorax; on the sides and behind there are some small tufts of black hairs, not visible from above; all the bristles are yellow, and only a little longer than the hairs; venter with long yellowish hairs. Legs white scaled, the tarsi and femora black, the tibiae dark yellowish; all the spines are long and yellow, even the 8-9 of the underside of the hind femora; claws black, those of the male twice as broad as those of the female. Wings with black basal comb, but under the base there are some yellow bristles, and inwards there is a tuft of long white hairs; costa white scaled; first posterior and discoidal cell rather short, the last broadly obtuse outwardly; discal cross-vein placed on the last third of the discoidal cell. The wings are almost entirely greyish hyaline, the costal cell and the base being only lightly yellowish-grey; the brown spots are small and less darkened, the greatest of all being, as usual, placed at the end of the second basal; first basal end at the base of the second submarginal cells; the others are at the end of the first and at the base of the third posterior cells; the cross-vein at end of the discoidal cell is, besides, margined with fuscous.

*BOMBYLIUS SPINIBARBUS*, sp. nov., ♂.

An entirely yellow-haired, very distinct species with red scutellum and yellow alar comb, forming a connecting link between the preceding and the following group, it being provided with a well-developed peristomial comb.

Type ♂, and an additional example of the same sex from Stellenbosch (Cape), November, 1887 (L. Péringuey).

Length of body 10-12 mm. Head black; frons moderately broad; all the hairs are yellow; those on the occipital border are short and those of the lower side are white; all the bristles are yellow, those on the first joint of the antennae are long, and those of the peristomial comb are whitish. Antennae black, with the third joint linear, but rather thick at base; proboscis black, 4-5 mm. long. Thorax black, densely clothed with rather short, entirely yellow hairs, which are white and shining in certain lights; the bristles are yellow, but less developed than in the foregoing species, only those before the root of the wings being strong. Scutellum entirely red above, with only the

base black, clothed with hairs like those of the thorax and without distinct bristles along the hind border; squamae brown, yellow-fringed; halteres with a white knob. Abdomen black, but sometimes red at the hind border and sides of the second segment; the hairs are like those of the thorax, but longer and tuft-like towards the end; the bristles at the hind borders of the segments are yellow and longer than the hairs, but very thin; venter with reddish hairs. Legs entirely yellow and with yellow spines; hind femora with 5-6 long yellow spines at the underside; claws reddish yellow, with black tip. Wings with yellow veins and with yellow basal comb; upper branch of the cubital fork much retreating at the base; first posterior cell acute at end and with a rather short stalk; second posterior cell very short, much broader than long; discoidal cell short and broadly obtuse at end, the discal cross-vein placed a little after its middle. The wings are greyish hyaline, but with a faint infuscation extended to the fourth longitudinal vein and to the cross-vein; there are traces of three less distinct dark spots on the ends of the second and of the first basal cells and on the base of the second submarginal cell.

*BOMBYLIUS ANGULOSUS*, sp. nov., ♂, ♀.

Very near the preceding, but distinct by its greater size, black margined scutellum, more spotted wings and by the peculiar venation.

Type ♂ and type ♀, a couple from Van Wyk's Vlei, Carnarvon (Cape), September (E. G. Alston), a badly preserved female specimen from Modder River (J. H. Power). Length of the body 13-14 mm. Head as in the preceding, with yellow hairs and bristles; frons of the female very broad, more than twice as broad as the eye, and bearing very strong and long bristles; peristomial comb long and strong, yellow. Antennae black, with the third joint less thickened at base; proboscis black, 5-6 mm. long. In the female the hairs of the face, chiefly those on the sides, are white, and the hind occipital border is white-scaled. Thorax as in the preceding, but the hairs on the breast are white, and in the female there are traces on the back of three dark longitudinal stripes. Scutellum red, with a black base and with a broad black hind border, or almost entirely black with a median red spot in the female. Abdomen as in the preceding. Legs entirely yellow and with yellow spines as in the preceding. Wings with yellow basal comb and with dark yellow veins; the discoidal cell is broader, and has beneath an angle prominent inwards and provided with the stamp of a vein; the basal infuscation is likewise less distinct; there are, however, more distinct but small brown clouds at the ends of the

first and second basal cells, at the base of the second submarginal cell, and at the bases of the second, third and fourth posterior cells; the second posterior cell is more elongate, about as broad as long.

*BOMBYLIUS NIGRIPECTEN*, sp. nov., ♂.

A species of medium size, distinct from the two following ones, which are likewise destitute of peristomial comb, by the wings having a black basal comb and being rather spotted.

Type ♂, a single specimen from Bushmanland, Henkries (Cape), (R. M. Lightfoot). Length of body 9.5 mm.

Head black, entirely clothed with long white hairs, only the vertex and the narrowest part of the frons with fuscous hairs; hairs of the occipital border very long and erect; frons rather narrow. Antennae entirely black, with white hairs at base, the third joint linear, not thickened at base, a little longer than the first; proboscis black, 4 mm. long. Thorax entirely clothed, even on the pleurae, with rather long white hairs, which on the back have a sericeous sheen; the bristles in front and near the base of the wings are well developed and of a yellowish colour. Scutellum with a deep black hind border, clothed, like the thorax, with yellowish bristles at the hind border. Squamae dirty brownish with fuscous border and long and dense grey fringe; halteres yellowish, with whitish knob. Abdomen black, only the three last segments being narrowly red on the sides; it is denuded, but its hairs seem to be longer but coloured like those of thorax, with some tufts of dark hairs on the sides; on the hind border of each segment, excepting the first, there is a complete row of very strong and long bristles, which, at least on the last four segments, are dark with yellowish base; the venter is clothed with white hairs and has strong bristles like those of the upper side; the genitalia are red in part. Legs with black femora and yellow tibiae and tarsi; the femora are clothed with silvery scales and have a yellow tip, which is broader on the four anterior ones; hind femora with a row of 7-8 very strong yellow bristles; underneath the hairs of the legs are all white and the spicules of the tibiae yellowish; claws black. Wings greyish hyaline, with black veins, but the first and the auxiliary vein are yellow; the anterior basal half show a distinct but faint infuscation; on the origin of the second longitudinal vein, on the discal cross-vein, on the anal cross-vein and on the base of the cubital fork there are rather distinct fuscous spots, and two other less distinct spots are set on the two basal angles of the third posterior cell. Upper branch of the cubital fork much retreating at base; first posterior cell rather narrow, acute at end and long-stalked; discal cross-vein set a little after the middle of the

discoidal cell, which is broad and short; second posterior cell longer than broad; third posterior cell in the shape of a trapeze. Basal comb well developed, consisting entirely of black bristles, with only a few white scaly hairs above.

*BOMBYLIUS PERINGUEYI*, sp. nov., ♂, ♀.

An elegant species, very distinct owing to the brown hairs of the thorax contrasting strikingly with the white ones of the middle of the abdomen; the wings are not spotted, but distinctly infuscated towards the base and along the costal cell.

Type ♂ and type ♀ from Klipfontein, Namaqualand (Cape), 1885 (L. Péringuey), the first specimen labelled by Bigot "*Systoechus peringueyi*, nov."; an additional female specimen from Spektakel, Namaqualand (Cape), October, 1890. I take pleasure in preserving for this beautiful species Bigot's MS. name in honour of the Director of the South African Museum, whose high merits in entomology are so greatly appreciated.

By the bristles of face and thorax the present species approaches those of the preceding group.

Length of body 11–12 mm. Head with wholly white hairs, but with brown hairs on the vertex and on the upper part of the frons; occipital hairs moderately long, but sometimes partly infuscated and with some bristles intermingled; on the genae there are some more or less distinct bristles of white or yellowish colour, more developed in the female than in the male. Antennae elongate, black, but the second joint sometimes brownish; the third linear, a little longer than the first; proboscis black, thick, 4–5 mm. long. Frons of the male rather broad, and that of the female nearly twice as broad, with distinct bristles on the sides. Thorax clothed with rather long and dense brownish hairs, which, seen in a certain light, are shiny white; pleurae white-haired; there are very numerous yellowish bristles on the fore part, on the sides and behind. Squamae brown, with yellowish or greyish fringe; halteres yellowish, with whitish knob. Scutellum red with black base, clothed, like the back, with yellowish and thin bristles behind. Abdomen with dense, erect white hairs, but at end with a fine tuft of brownish ones, coloured like those of the thorax; on the sides of the first segment there are broad tufts of brownish hairs, with similarly coloured bristles; the last two segments in the male and the last three in the female bear rows of strong and long bristles of a blackish colour with yellow base; the hairs at the end of abdomen are tuft-like; venter with dense white hairs, in the male almost without distinct bristles, in the female with

strong bristles at apex and with a very dense tuft of black bristles in the middle before the apex; male genitalia of a pale reddish colour. Legs yellow, with the femora more or less broadly black at base; they are provided with silvery scales and have yellow spines, those of the hind femora very numerous and strong; claws black, with yellow base. Wings hyaline, yellowish at base and along the costal cell and base of the subcostal cell; discal cross-vein and end of second basal cell sometimes narrowly margined with fuscous; basal comb large, yellowish, white-scaled and white-haired above; veins yellow, infuscated at end; disposed like the preceding species, but the discal cross-vein placed distinctly before the middle, nearly at the first third of the discoidal cell.

One female has the hairs on the back of thorax white, not brownish.

BOMBYLIUS ARGENTIFER, Walker (1840).

A couple of specimens from Spektakel, Namaqualand, and Clanwilliam (Cape) determined as *argentifer* by Bigot. They answer very well to the description of this species from the Cape. It is closely allied to the preceding, but distinct by the much less developed bristles, entirely white hairs of the thorax, wholly hyaline, vitreous wings with the discal cross-vein placed on the middle of the discoidal cell; in the female the wings show a trace of the coloration of the preceding near the base and on the cross-veins. The venter of the female is destitute of black tuft; and the female only has at the end of the abdomen some scarce brownish hairs, which do not form the distinct tuft of the preceding. Hind femora below with the usual strong spines.

BOMBYLIUS MOLITOR, Wiedemann (1830).

A couple of specimens from Bushmanland, Jackal's Water, and Henkries (Cape) (R. M. Lightfoot). This species also has never been recorded since its original description, and is closely allied to the preceding one, being distinguished by the very broad frons of the female, by the strong bristles of the abdomen and by the punctate wings. Bristles of genae and of peristome entirely wanting; frons of the male as narrow as in the preceding, that of the female with bristles on the sides; third antennal joint linear, but very much narrowed in its last half. Hairs of body white or grey; bristles of thorax, scutellum and abdomen very numerous and long, yellowish, but those on the abdomen of the female black with yellow base, well developed even on venter. Legs clothed with dense silvery scales, the femora black, those of the hind pair with strong spines below even



near the base. Wings with the neuration as in the two preceding species, but the discal cross-vein before the middle of the discoidal cell, and the upper branch of the cubital fork usually provided with a short stump near the base. The six fuscous spots on the cross-veins and bifurcations are much less developed, but always distinct.

The present species is somewhat aberrant owing to the unusually broad frons of the female, which thus approaches that of the following group; but the antennae are not widely separated at the base.

#### (D) GROUP OF *B. senex*.

To the present group I refer the species which are like the South European *B. senex*; they have a rather elongate, ovate body, the eyes of the male are separated, the frons of the female is very broad and long-haired, but with the bristles much less distinct than in the *micans* group. The antennae are rather distant at the base, with the first joint distinctly thickened—much more thickened than in any other group of the genus *Bombylius*. The mouth-opening is very broad, and around it there is a very prominent and large praelabrum, which is differently coloured from the face and the peristome; the face, besides, is very short. Hind femora without bristles at base, underneath provided with long hairs alone; in *senex* there are some bristles near the end, which are wholly wanting in the North African *separatus*, Beek, as in the new South African species here described. Wings rather narrow, with the discal cross-vein placed on the last third of the discoidal cell; basal comb very indistinct, almost wanting; there is usually a rather long, recurrent stump at the base of the upper branch of the cubital fork.

#### *BOMBYLIUS HIRTICEPS*, sp. nov., ♀.

Closely allied to *separatus*, Beek, from Tunis, but distinguished by the darker hairs of the face, by the absence of the stump at the base of the cubital fork, and by the shorter claws.

Type ♀, and another specimen of the same sex from Fraserburg (Cape), June, 1885 (E. G. Alston).

Length of body 8.5–10 mm. Head black, grey-dusted; frons very broad, about three times as broad as the eye, very long-haired, but without distinct bristles; the hairs on frons, face and genae are mostly black, but towards the middle line there are numerous yellow hairs. Antennae black, of the usual length of the preceding group, but of a peculiar structure; the first joint is distinctly thickened, grey-dusted, clothed with long black hairs; the second joint is ovoid; the third is long and thin, a little longer than the first linear, but at the extreme

base it shows an annular swelling which has the shape of a supplementary joint of a lighter brownish colour; in addition the antennae are distinctly separated at base—a feature never so developed in the true *Bombylius*, chiefly in those of the group *micans*. Mouth-opening very broad, the praelabrum being very large and prominent and of a rather shining, black colour; proboscis short and thick, 8 mm. long; occipital hairs very long, those near the eye black, the other yellowish. Thorax black, clothed with rather long, yellowish-grey hairs, which, seen from the front, are shining white; there are on the sides and on the hind part numerous but thin, black bristly hairs longer than the usual pubescence; there are besides two rows of such hairs along the dorsocentral lines; on the pleurae these black hairs are more numerous, and sometimes the pleurae are entirely black-haired. Scutellum entirely black, clothed like the thorax, and with similar black bristles on the hind border and even on the disc. Squamae brownish, with a long yellow fringe; halteres with a blackish knob. Abdomen altogether of an opaque velvety black colour, like the thorax and scutellum, and clothed with similar hairs; there are rows of black, bristly hairs on the hind borders of the segments and tufts of black hairs at the apex and on the sides underneath, the venter being much darker-haired than the upper side. Legs reddish yellow, but the femora more or less black near the base, and sometimes almost entirely black; tarsi also blackened at end on the upper side; the femora are destitute of silvery scales, but are clothed with very long black hairs; those of the hind pair are absolutely without spines underneath; all the spines of the tibiae and tarsi are black; those of the four anterior tibiae are longer than usual; claws very short, black, with reddish base; pulvilli yellow, about as long as the claws. Wings greyish-hyaline, rather narrow and cuneiform, hardly faintly infuscated at the extreme base and along the fore border; veins yellow, blackened at end; basal comb very little developed, almost wanting; upper branch of the cubital fork much retreating at base without recurrent veinlet; first posterior cell broad, acute at end and moderately stalked; discal cross-vein on the last third of the discoidal cell, which is rather narrow and rather attenuated outwardly, the cross-vein dividing it from the second posterior cell being short; second and third posterior cells almost of equal size.

SYSTOECHUS, Loew.

Neue Beitr. iii, p. 34, 1855.

This genus seems to be well represented in the South African fauna. The species are rather difficult to separate, as already stated by Loew;

but at the Cape there are some striking forms very distinct from the others. Those in the collection can be distinguished as follows :

- 1 (12). Abdomen destitute of black bristles at the hind border of the segments—at least on the middle line.
- 2 (9). Legs mainly yellow, the femora sometimes with dark base.
- 3 (6). Species of very great size (13–16 mm.), without black bristles on the abdomen or with yellow ones; femora almost bare beneath, those of the front pair with many spines underneath.
- 4 (5). Proboscis conspicuously scabrose beneath; eyes of male broadly separated; thorax striped on back and pleurae; pulvilli very small.  
*scabrirostris*, sp. nov.
- 5 (4). Proboscis smooth beneath; eyes of male very approximate; thorax not striped; pulvilli well developed . . . *ventricosus*, sp. nov.
- 6 (3). Species of smaller size, not above 11 mm. in length; abdomen with some black bristles; femora much hairy beneath, those of the front pair not spinose or only with 1–2 spines below.
- 7 (8). Scutellum red, at least in the middle; frontal triangle of the male small and with a distinct furrow; mystax yellow; wings hyaline, with yellow veins . . . *simplex*, Loew.
- 8 (7). Scutellum altogether black; frontal triangle of the male broad and swollen, almost without furrow; face fringed with rigid black hairs; wings strongly infuscated, with black veins. *tumidifrons*, sp. nov.
- 9 (2). Legs black, the femora entirely black, or only those of the hind pair with pale end.
- 10 (11). Species of greater size, measuring not less than 9 mm. in length; scutellum red, at least in the middle; legs stout and spinose.  
*albidus*, Loew.
- 11 (10). Species of smaller size, not above 7 mm. in length; scutellum entirely black; legs thin and less spinose . . . *nigripes*, Loew.
- 12 (1). Abdomen with complete rows of very strong and distinct black bristles at hind border of the segments.
- 13 (14). Eyes of the male separated; front legs usually black-spotted on femora and tibiae; species of larger size, measuring 7–14 mm., but usually 10–12 mm. . . *mixtus*, Wied.
- 14 (13). Eyes of the male almost contiguous; front legs with yellow tibiae and femora; smaller size, not more than 10 mm. in length.
- 15 (16). Thorax with yellow hairs, which are rather long, and without bristles in front . . . *ctenopterus*, Mik.
- 16 (15). Thorax clothed with short, paler hairs, which show silvery sheen and on the pleura are of a whitish colour, and provided with brownish bristles in front . . . *spinithorax*, sp. nov.

SYSTOECHUS SCABRIROSTRIS, sp. nov., ♂, ♀.

A gigantic species, very distinct from any other by the pattern of the thorax, by the shape of the labium and by the shortness of pulvilli, making a passage to the genus *Anastoechus*.

Type ♂ and type ♀, a single pair of specimens from Namaqualand, Springbok and O'Okiep (Cape), September and October, 1890 (R. M. Lightfoot).

Length of body 15–16 mm., of wing expanse 36–38 mm. Head of much broader shape than usual, black on the occiput, but yellowish on the face and genae, clothed with greyish-dusty; frons a little hollowed at vertex, the ocelli being placed on a very prominent tubercle; its breadth at the narrowest point is in the male as broad as the ocellar tubercle, the frontal triangle in the same sex being broad and provided with a deep, longitudinal middle furrow; in the female the frons is very broad, with the middle furrow distinct basally only and with a deep transverse furrow before the ocelli, homologous with the less developed one which is to be observed at the same point in the male. Face broad and much projecting, mouth-opening rather short and broad; gena broader than usual; proboscis rather long, straight, 11–12 mm. long, entirely black; the labium is conspicuously scabrose beneath, owing to the fact that it is clothed almost on the whole length with very numerous but short spinules, which in the female are distinct even at the base of the labella. Palpi long and slender, black, with very short black hairs. Antennae wholly black, rather distant at base; first joint with short but strong yellowish hairs; second joint globular; third joint longer than the first two taken together, with an ovate base, but with the linear terminal part longer than the basal and ending in a minute style. All the hairs at the head are rather short and light coloured; those on the very swollen and broad occiput are white if viewed from the side, and very dense; the hairs on the ocellar tubercle and on the vertex are brownish, yellowish, on the frons, scarce and rigid towards the middle, denser and soft on the sides; the face is almost bare in the middle and has on the sides rather short, pale, yellowish hairs. Around the mouth-borders there is a fringe of short, but dense, yellowish hairs, leaving the lower part of the genae bare; peristome almost bare; beard on chin, much less developed, white. Eyes bare, with the upper areolets not at all enlarged in the male. Thorax entirely black, broad and stout, rather flattened above; clothed with dense and short hairs of equal size, which are only a little longer on the sides and on the pleura; the hairs on the back are of a brownish-yellow colour, but if viewed from the front show a white sheen chiefly in the male; in certain lights there are to be seen four longitudinal white stripes, two on the middle and two on the notopleural line, one on each side, all placed at equal distance, not extending over the middle, and more distinct in the female than in the male. On the pleurae, between the reddish-brown hairs, there are two vertical bands of white

hairs, a less distinct one in front and a much broader one on the mesopleura, extending to the breast; metapleural tuft very dense and of a reddish brown colour; the notopleural and supraocellar bristles are yellow and long, chiefly the latter ones. Scutellum broad, reddish brown, black at base, and, on the hind border, clothed like the thorax and with strong yellow bristles on the hind border. Squamae yellowish brown, with a dense and long white fringe; halteres with brown knob and whitish end. Abdomen broad, obtuse, rather shining black, narrowly red on the sides in the male, in which sex it is void of bristles, clothed with rather short, dense and soft, equal hairs, which, viewed from behind, are of a light yellowish colour, and viewed from the front are whitish with a silvery sheen; in the female the hairs are of a darker colour, and at the hind border of the segments there are short but strong brownish bristles disposed in many rows, but interrupted in the middle. The venter in the male is yellow towards the middle, while in the female it is entirely black, clothed in both from the base to the middle with silky hairs, and from the middle to the end with dark hairs. Male genitalia proportionally small, hidden, of a dark colour; anal tuft of the female reddish. Legs rather stout but long, wholly of a reddish yellow colour, the hairs only being blackened at end; they have pale yellowish, little-developed scales, and numerous black spines, but they are almost absolutely bare, even the front femora being destitute of hairs underneath at base; the spicules are well developed and numerous, but short in the front tibiae. All the femora are spinose beneath, even those of the front pair being provided with many short spines, disposed in two rows; spines of the hind femora very numerous underneath, 13-14 in number, extending from the base to the end, but those of the minor row are very short, the row of the upper side being 2-3 apical spines. Claws long and thin, black with reddish base; pulvilli whitish, very small, as long as half the claws. Wings long and narrow (length of a wing 16 mm., breadth of a wing 5 mm.); basal comb very strong and black, whitish yellow, pilose at base, with reddish sheen on the bristles in the male; they are greyish yellow, faintly infuscated at base and along the fore border to the end of the first vein, the brown yellowish tint running obliquely across the cross-veins to the middle of the anal cell, but without being well defined. Alula infuscated, with a short yellowish fringe. The veins are red, infuscated at end; the second longitudinal vein is strongly sinuous; the first posterior cell is long and narrow, narrower than the discoidal cell, which is rather obtuse at end, but not in such a manner as in *Anastoechus*; second and third posterior cells of equal length, but the former much broader at end.

## SYSTOECHUS VENTRICOSUS, sp. nov., ♂.

This species is much like the larger specimens of *micetus*, Wied., but is at once distinguished by the more narrowly approximated eyes of the male, by the entirely yellow legs and abdominal bristles and by the non-infuscated base of the wings.

Type ♂, a single specimen from Stellenbosch (Cape) (L. Péringuey), 1888.

Length of the body 13 mm., of the wing 13 mm. Head black, dusted with grey, of the usual shape, viz. much smaller than in *scabrirostris*. The occiput is clothed with dense and short fulvous hairs, which become paler below, changing to a quite white beard; the frons is very narrow, its breadth at the narrowest point being half as much as the distance between the two basal ocelli; it is clothed in the middle with erect black hairs like those of the ocellar tubercle, and on the sides with shorter and yellow ones. The frontal triangle is half as broad as in the preceding species, with a less distinct median furrow; the face is entirely clothed with dense hairs, which are black on the middle and on the sides and yellow along the mouth-borders, forming a dense fringe which is produced to the extreme end of the genae. Peristome short and moderately broad; the bare eyes have the upper areolets a little larger than the lower ones. Antennae entirely black, the first joint with long and rigid black hairs above and below; third joint longer than the two first joints taken together, almost linear, broadening very little towards the base. Proboscis entirely black, 6.5 mm. long, with the labium smooth below; palpi hidden. Thorax clothed with short, equal and dense fulvous hairs, without any black hairs or bristles, and with strong sericeous sheen if viewed from the front; before the root of the wings others are bright fulvous tufts, which on the pteropleura and on sternopleura are paler but on the breast are still fulvous; metapleural tuft fulvous. Scutellum entirely red, with only a very narrow black base, clothed like the thorax and with yellow bristles at the hind border. Squamae yellowish, with dense fulvous fringe; halteres with whitish knob. Abdomen broad and ovate, black, but narrowly red on the sides, clothed with dense equal fulvous hairs like those of the thorax; hind border of the segments with fulvous bristles which are concealed among the fur; venter with dense fulvous hairs and with a stripe of white hairs on each side; genitalia of greater size, their lamellae fulvous, with dark base. Legs entirely yellow, the coxae and the extreme base of femora and almost the whole of the tarsi blackish; they are clothed with pale scales and have a few pale hairs on the base of the femora below; the

spines are black, but those of the four anterior tibiae are partly yellow. Front and middle femora with rather numerous but short spines below; hind femora with 9-10 strong spines on the complete inferior row, the other rows being reduced to a few spines on the apical half. Claws black, with red base; pulvilli whitish, about as long as the claws. Wings hyaline, narrowly yellowish at the extreme base, in the first basal and in the costal cells; alula almost hyaline, with a short yellow fringe; basal comb of large size, black, yellow tomentose near the base. Veins red, a little darkened at end: venation as in the preceding, with the oval cell broadly open.

*SYSTOECHUS SIMPLEX*, Loew, 1860.

A species closely allied to the preceding one, but at once distinguished by the smaller size, the whitish, not fulvous, pubescence, the unarmed front femora, and by having a few but distinct black bristles on the sides of the last abdominal segments.

Some specimens of both sexes from Stellenbosch and Hex River, (Cape) (L. Péringuey), December, 1884.

The undescribed female is very like the male; the frons is very broad, with some bristly dark hairs on each side; palpi short, clavate, yellow, with black end; femora entirely yellow to the extreme base. Upper areolet of the eyes of the male a little enlarged; frontal triangle small and with a less developed middle furrow; third antennal joint linear; labium smooth below. Spicules of the 4 anterior tibiae well developed, partly yellow; front femora without spines, middle femora with 3-4 long spines; pulvilli as long as the claws.

*SYSTOECHUS TUMIDIFRONS*, sp. nov., ♂.

Readily distinguished by the broad and tumid frontal triangle, the black scutellum, the face fringed with rigid black hairs, the yellow legs and the strongly infuscated base of the wings.

Type ♂, a single specimen from Barberton, Transvaal, April, 1911 (H. Edwards).

Length of body 10 mm.; length of a wing 9 mm. Head black, dusted with grey dark yellow at the mouth borders and on the chin; occiput less developed than in all the preceding species, almost hollowed instead of being inflated, clothed with dense, rather long, pale yellowish hairs; chin and lower part of occiput with a long, conspicuous, quite white beard. Frons at the narrowest point as broad as the ocellar tubercle, and afterwards expanded in a very broad and inflated frontal triangle, the middle furrow of which is distinct but not

deep; it is clothed, like the vertical triangle, with long, erect, rather strong, black hairs, and only near the sides with some very short yellow ones. Face short but much produced, with rigid black hairs forming a long moustache-like fringe, very much developed and produced horizontally, and extended to the extreme end of the genae, only on the sides, near the eyes, are a few short yellow hairs; upper areolets of the eyes hardly enlarged. Antennae entirely black; first joint with dark yellowish hairs, which are longer below than above; third joint as long as the two first joints taken together, gradually tapering in a moderately thin point; proboscis entirely black, straight and thin, 6 mm. long, with the labium smooth below; palpi short, club-shaped, black with paler base. Thorax clothed with rather long pale yellowish hairs, which viewed from the front show a whitish tinge; on the pleurae they are a little longer but scarce, and white with a sericeous sheen; on the notopleural line there is a distinct stripe of darker, sometimes blackish, hairs; bristles whitish yellow; metapleural tuft rich and white. Scutellum entirely black, clothed with long hairs like those of the thorax, with no distinct bristles on the hind border, or at least they are concealed within the hairs. Squamae whitish yellow, with white fringe; halteres with white knob. Abdomen entirely black, clothed like the thorax but the hairs are whiter, with a silvery sheen; there are rather numerous and distinct black bristles on the sides of the last segments; venter with whitish hairs and black erect bristles along the middle; genitalia red, of medium size. Legs yellow, with tarsi and coxae black; base of the 4 anterior femora and end of the hind tibiae more or less broadly infuscate; they bear white scales, few white hairs on the base of femora, and black spines. Spicules of the 4 anterior tibiae well developed; front femora with 1-2 short spines, middle femora with 3-4 long spines, hind femora with 7-8 very long spines, the other rows being less developed; coxae with long and dense white hairs; claws thin, black, with narrowly red base; pulvilli whitish, long. Wings with the usual venation, but with black veins; they are strongly infuscated from the end of the first longitudinal vein to the end of the second basal cell and to the base of the alula, which has a yellowish fringe; basal comb of great size, black, pale tomentose basally; discoidal cell obtuse at end, its terminal vein as long or even a little longer than the discal cross-vein.

*SYSTOECHUS ALBIDUS*, Loew (1860).

Very near the two preceding species, but distinguished by the black femora and by the more numerous abdominal black bristles. A single



male specimen from Smithfield (Orange Free State), 1910 (D. R. Kannemeyer). The scutellum is red, black at the base and at the hind border; spicules of the anterior tibiae well developed, but the front femora are unarmed; all the spines of the legs are black.

*SYSTOECHUS NIGRIPES*, Loew (1863).

Very closely allied to the preceding species, but half as small, and with broadly separated eyes in the male and also with an entirely black scutellum.

A male specimen from Klerksdorp, Transvaal, December, 1890, and another from Kimberley (Cape), March, 1912 (J. H. Power).

Eyes of the male separated for a distance equal to the breadth of the ocellar triangle; antennae entirely black, with the third joint rather short, linear, not narrower at end than at base; proboscis and palpi black. Squamae whitish; halteres white. Hairs on the whole body pale yellowish, but if viewed from the front they are almost white; abdomen with only a few less distinct or even not distinct black bristles at the end of the sides. Legs entirely black, with only the knees a little yellowish, while in *albidus* the tibiae are more or less but always broadly yellow; the 4 anterior tibiae are thin and with less developed spicules; front femora unarmed, middle femora with 1-2, hind femora with 5-6 spines below. Basal infuscation of the wings rather broad, but of a more yellowish fringe; basal comb long, black, but with thin and more sparse bristles; discoidal cell shorter than usual, and therefore the second and third posterior cells longer than in all the preceding species.

*Note.*—The present species is closely allied to the European *S. leucophaeus*, Meig., being chiefly distinguished by the more broadly separated eyes of the male.

*SYSTOECHUS MIXTUS*, Wiedemann (1821).

A well-known and common South-African species, easily distinguished by the complete rows of black bristles on the abdomen and by the partly black spotted front legs, the front femora being also unarmed below.

A female specimen from Salisbury (S. Rhodesia), June, 1913; another from Bushmanland, Henkries (Cape), October, 1911 (R. M. Lightfoot); another from Marico (Transvaal), April, 1911 (A. T. Cooke); and one from Natal, Maritzburg, labelled by Bigot as *B. aurantiacus*, Macq.,

which of course cannot be so, because Macquart's species is a true *Bombylius* and not a *Systoechus*. I have also seen the present species from Grahamstown (Cape).

*SYSTOECHUS CTENOPTERUS*, Mikane (1796).

This Palearctic species, which seems to be widely spread over the Ethiopian region, is closely allied to *mixtus*, but distinguished by the smaller size, the eyes of the male, which are very much more approximated, and by the entirely yellow front legs of the female, the middle femora being also less spinose beneath. A single female specimen from Stellenbosch (Cape) (L. Péringuey).

*SYSTOECHUS SPINITHORAX*, sp. nov., ♂.

Nearly allied to the preceding species, but distinguished by the silvery sheen of the hairs of the thorax and of the base of the abdomen, and differing from any other on account of the strong bristles on the fore border of the thorax.

Type ♂, a single specimen from Klipfontein (Namaqualand) (Cape), November, 1885 (L. Péringuey).

Length of the body 9.5 mm.; spread of the wings 23 mm. Head black, a little dark yellowish along the mouth borders; occiput less developed, clothed with soft and dense greyish hairs, which viewed from the front are whitish, becoming quite white below like those of the chin; ocellar tubercle with black hairs; frons very narrow, the eyes almost touching, being separated by a very narrow streak not broader than the width of the fore ocellus; frontal triangle small; with less distinct middle furrow, with long and erect black hairs on middle and with short and dense, depressed white hairs on the sides; facies rather long and prominent, clothed with short and dense whitish hairs, and longer and erect black ones, the moustache not extending to the extreme end of the genae, the last portion of which is therefore bare, as in *scabrivostris*; peristome narrow. Eyes with the upper areolets more distinctly enlarged than usually; antennae entirely black, with the first joint with long black hairs; third joint a little longer than the two first taken together, with the basal half broadened and narrowly ovate and the apical half linear; proboscis entirely black, 7 mm. long, with the labium smooth below; palpi short and hidden. Thorax black, clothed on the dorsum with very short greyish hairs, which, viewed from the front, show a silvery sheen; pleurae and breast white haired; notopleural line with darker hairs; notopleural and postular bristles brownish; metapleural tuft white, a little

yellowish below. Scutellum red, black at base, clothed, like the thorax, with strong brownish bristles on the hind border. Squamae whitish yellow, with yellowish fringe, which show a white sheen; halteres with white knob. Abdomen short, rotund, black; the hairs disposed on separate rows and of a greyish lacteous colour, those on the base, sides and end with strong silvery sheen; there are complete rows of strong black bristles on the hind border of the segments; venter with white hairs and black bristles in the middle; genitalia hidden. Legs entirely yellow, with black coxae and last tarsal joints infuscate; they have white scales, white hairs on the femora and black spines; the spicules of the four anterior tibiae are slender, but well developed; front femora without any, middle femora with one, hind femora with 6-7 spines below. Claws black, with a red base; pulvilli whitish, long. Wings hyaline, a little darkened at the extreme base and along the first basal and the costal cells; alula almost hyaline, yellow fringed; basal comb of larger size, black, yellow-pollinose near the base; veins red, a little darkened at end; venation of the usual type, the discoidal cell rather pointed at end, its apical cross-vein being only half as long as the discal cross-vein.

*SYSTOECHUS FULIGINEUS*, Loew (1863).

Very distinct from all the other species having strong black bristles on the abdomen, on account of the very dark, almost blackish furriness of the body.

A female specimen from Namaqualand, Spektakel, October, 1890 (R. M. Lightfoot), measuring less than 9 mm. in length. I refer it to the male of greater size (13 mm.) described by Loew in a few words from Bloemfontein, chiefly on account of the dark furriness of the body; from *S. austeni*, Bezzi, from Rhodesia it is distinguished by the non-ciliated third antennal joint and by the infuscated wings. Occiput with yellowish hairs, frons and face with more infuscated ones. Antennae entirely black, with the first joint more than twice as long as the second, and a little shorter than the third, which is of elongate conical shape and quite bare. Proboscis entirely black. The dullish black thorax and the shining reddish scutellum are clothed with fuscous hairs and with black bristles. Squamulae yellowish-brown with a whitish fringe; halteres with a white knob. Abdomen black, rather shiny, with fuscous hairs and with very numerous and strong black bristles at hind border of the segments; venter with pale yellowish hairs at base; anal tuft dirty whitish. Legs stout, entirely blackish-brown, but with yellowish scales on the femora; all the spines

and spicules are black; hind femora with a complete row of 8-10 spines below. Wings with a fuscous basal comb and with dark yellowish veins; they are yellowish-infuscated at base and along the fore border, and greyish-hyaline on the rest. Discoidal cell obtuse at end; second longitudinal vein undulated; third posterior cell much narrower than the second; anal cell broadly open.

A very small female specimen (only 4 mm. in length) from Namaqualand, O'Okiep, 1885 (L. Péringuey), has the frons with parallel sides and about as broad as the eye; the thorax is black on the back, with 4 longitudinal greyish stripes, 2 of which are on the dorso-central lines and 2 on the sides; the abdomen with rather distinct pale yellowish bristles at hind border of the segments.

#### ANASTOECHUS, Osten-Sacken (1877).

This genus is well represented in the South African fauna—a fact entirely unknown hitherto, and even not suspected before. The species can be easily distinguished from those of the preceding genus, not only on account of the characters given in the table, but also by the following ones: The face is white-haired; the underside of body is white-haired; the spines of the legs are always strong and always yellow or white; there are often strong bristles on the face and the basal joints of the antennae are usually of a red colour; the abdominal fur is long and usually tuft-like, and between it there are usually strong and long bristles at the hind border of the segments; the basal comb of the wings is very often yellow or white.

The species in the collection can be distinguished as follows:

- 1 (12). Body without a silvery pubescence above and always with distinct bristles on the abdomen; scutellum red, at least on the disc.
- 2 (3). Genae with a distinct comb of strong, yellowish bristles; wings variegated, with the marginal cell completely filled with brown to the end, and with a yellow basal comb; antennae with red base. *rubricosus*, Wied.
- 3 (2). No distinct peristomial comb; wings with the marginal cell hyaline—at least in its terminal half.
- 4 (7). First joint of the antennae very short, not longer than twice the length of the second; face of the male without bristles; hairs of thorax very short; femora mainly yellow; wings of the male dimidiate.
- 5 (6). First antennal joint red; eyes of the male rather separated; wings with the basal comb black and yellow. *varipectus*, sp. nov.
- 6 (5). First antennal joint black; eyes of the male more widely separated; wings with the basal comb entirely yellow. *ceri*, Loew.
- 7 (4). First joint of the antennae rather long, three times the length of the second; hairs of thorax long; femora mainly black.

- 8 (11). Wings infusate or dimidiate, with a black basal comb of usual size ; face even in the male with distinct bristles ; antennae entirely black.
- 9 (10). Head and thorax with numerous black bristles ; eyes of the male broadly separated, with small areolets ; palpi black ; wings infuscated basally . . . . . *erinaceus*, sp. nov.
- 10 (9). Head and thorax with yellow bristles ; eyes of the male very approximate and with enlarged areolets above ; wings of the male dimidiate. *macrophthalmus*, Bezzi.
- 11 (8). Wings hyaline, with a small and whitish basal comb ; face of the male without bristles, and eyes in the same sex rather separated ; antennae of the male entirely black, with yellow base in the female. *innocuus*, sp. nov.
- 12 (1). Body wholly clothed with a long, silvery pubescence and without distinct bristles even on the abdomen ; scutellum entirely black ; wings hyaline, with a very small and silvery basal comb. *leucosoma*, sp. nov.

ANASTOECHUS RUBRICOSUS, Wiedemann (1821).

A very characteristic species, distinct from any other on account of its strong peristomial comb and of the very peculiar wing pattern.

Some specimens of both sexes from Namaqualand, Springbok, November, 1890 (R. M. Lightfoot) ; O'Okiep, October, 1885 (L. Péringuey) ; Bushmanland, Jackal's Water, Namaqualand (Cape), October, 1911 (R. M. Lightfoot). One specimen was already recognised by Bigot as belonging to the present species.

This species was not recorded since Wiedemann's description. It is very variable in size, measuring in length 9–13 mm., but one female is only 6 mm. The second antennal joint is red like the first ; the attenuated part of the third joint is very long and thin. The frons is without black hairs—in opposition to Wiedemann's statement (*Stirne schwarz behaart*) ; the bristles on the face are of the same colour as the fur, but they are always distinguishable, and those of the genae are very distinct, numerous and free. Eyes of the male broadly separated, their distance being about twice as broad as the base of the ocellar triangle ; areolets of equal size. Proboscis rather short, black, but the labium is usually red at the extreme base below ; palpi yellow. Thorax with long hairs and with no black ones ; those on pleurae and breast are whitish ; scutellum red ; all the bristles are of the same colour as the fur. Abdominal fur very long and tuft-like ; the numerous bristles are longer than the hairs, disposed in complete rows, and are pale at base and dark brown at end. Venter yellow, with pale pubescence and short yellow bristles along the middle ; anal tuft of the female very conspicuous, yellow ; male genitalia hidden within the dense apical tuft. Legs with only the apical part of the

last tarsal joint black; they have whitish scales on the femora and entirely yellow spines, which are well developed even on the anterior tibiae; front femora with 2-3, middle and hind femora with very numerous spines below; claws red with black end; pulvilli yellowish, much shorter than the claws. Wings with a peculiar pattern of a light yellowish-brown tint; the marginal cell is completely filled to the end; the discoidal cell is almost entirely hyaline; the infuscation of the base and fore border shows three points separated by hyaline spaces, one at the end of the marginal cell, the second at the base of the cubital fork and the end of the first posterior cell, the third at the end of the second basal cell, passing a little over the discal cross-vein. There is a distinct pale yellowish, longitudinal streak on the whole of the first basal cell, more or less broadened towards the base and below. Discoidal cell with parallel sides, as broad at end as the base of the second posterior cell; its apical cross-vein is longer than the discal cross-vein. Basal comb formed with entirely pale yellow bristles; alula yellowish, with long yellow fringe; veins of a red colour, infuscated at end. In the present species the first posterior cell is much narrower than the discoidal cell.

ANASTOECHUS VARIPECTEN, sp. nov., ♂, ♀.

This species, probably only a variety of the following one, is distinguished by the characters given in the table.

Type ♂ from Spektakel, and type ♀ from O'Okiep, Namaqualand (Cape), October, 1886 (L. Péringuey), this last specimen being determined by Bigot as *Systoechus mixtus*, Wied.

Length of body 13 mm.; of wing expanse 32 mm. Head yellow on the face, black on the vertex, but the ocellar tubercle in the male is of a dark red colour; eyes of the male with the upper areolets only a little enlarged, separated for a distance as broad as the ocellar tubercle; frons of the female very broad, broader than the eye, provided on each side with very numerous and strong brownish bristles directed forwards and outwards, a dense tuft of short bristles of darker colour being placed on the ocellar tubercle; occiput clothed with short hairs, which are yellowish only in the upper part and pure white on the sides and below. In the male the frontal triangle, the face and the cheeks are clothed by short but dense white hairs without any bristle, only the ocellar tubercle being clothed with yellow hairs. In the female the frons has a short yellow pubescence, which is white on the face and on the cheeks, but in the middle of the face there is a spot of yellow hairs in which some bristles of the same colour are noticeable, while two or three distinct bristles are present also in the middle of the

sides. The genae are clothed with white hairs, and are absolutely destitute of bristles in both sexes. Antennae with the first joint very short, only twice as long as the second; pale red in the male and clothed with white hairs, dark red with yellow hairs in the female; the second joint is globular and black; the third is black, about twice as long as the two first joints taken together, only a little dilated at base and gradually tapering in a long styliiform end. Proboscis black, short, 6.5 mm. long, with the basal ring reddish yellow and with the extreme base of the labium dark red below; palpi reddish-yellow, very thin, with short whitish hairs and with a few longer ones at end; peristome yellow. Thorax black, clothed with short equal hairs of a tawny colour, darker in the female; on the pleurae and breast the hairs are short and quite white; in the male the bristles are pale yellowish and only notopleural and post-alar; they are darker in the female, and in addition there is a strong tuft below the notopleural line, and other tufts in front behind the head and on the hind border of mesopleura. Scutellum red, with soft hairs like those of thorax, and with strong, pale, or dark yellowish bristles at the hind border. Squamae dirty yellowish, with a white fringe; halteres yellowish. Abdomen black, with the hind border of the segments and the venter red; it is clothed with dense and equal pale yellowish hairs, which from a front view show whitish sheens, and are denser in the male than in the female, but in both are distinctly tuft-like at end; there are complete rows of bristles at the hind borders of the segments, thinner and pale yellowish in the male, stronger and darker in the female; venter with scarce white hairs and almost destitute of bristles. Male genitalia yellow, anal tuft of the female luteous, but in both they are hidden within the fur. Legs entirely pale yellow, even at the end of the tarsi; the femora are bare and clothed with white scales; all the spines are yellow, the front femora with 1, the middle with 3-4, the hind with 7-9 spines below. Claws yellow, with black end; pulvilli yellowish, one third as long as the claws. Wings with the basal comb formed by yellow and black bristles; they are hyaline, but with a basal infuscation of a pale yellowish-brown tint, more extended in the male than in the female, but in both not surpassing the end of the first vein; in the male the border of this infuscation goes obliquely from the above-named point to the end of the fourth posterior cell, the second basal, anal and axillary cells being in greater part hyaline; in the female the infuscation is almost limited to the fourth vein; alula hyaline, with pale fringe. Veins rufous, a little infuscated at end. Discoidal cell broadly truncate, but its sides less parallel than in the preceding species, and its apical

cross-vein a little longer than the discal cross-vein; first posterior cell as broad as the discoidal one.

*ANASTOECHUS CERVINUS*, Loew (1860).

Easily distinguishable by the yellow basal comb of the wings and by the entirely black antennae, the first joint of which is short. A male and a female from the Cape, without precise locality. To Loew's original description may be added: face and genae destitute of bristles; antennae with the first joint only twice as long as the second; eyes of the male with the upper areolets a little enlarged, separated for a distance which is only as broad as the fore ocellus (a fact which seems to be contrary to Loew's statement); proboscis entirely black, with yellow basal ring; palpi yellow; hairs of frons entirely white. Scutellum red. Abdomen black, with red sides and red hind border of the segments; its bristles are not longer and not darker than the fur. Front femora with one, the others with more spines below; pulvilli very short. Wings with the two basal cells, the anal and the axillary cells almost entirely hyaline; neuration as in the preceding species.

The female, hitherto undescribed, has a broad frons, which is broader than the eye, and bears on the sides and on the ocella numerous but not very strong tubercles and dark yellow bristles; face without bristles, rather bare above the upper mouth-edge, and there shining yellow; proboscis with a black basal ring. Abdomen and venter entirely black, with the hind border of the segments narrowly yellowish; bristles strong and long, but of a pale yellowish colour like the fur. Hind femora below more reddish yellow, with whitish scales. Wings almost entirely hyaline, the fuscous pattern of the male being only indicated by a hardly distinct greyish tint.

*ANASTOECHUS ERINACEUS*, sp. nov., ♂, ♀.

A very peculiar and bristly, dark species of medium size, very distinct from any other on account of the numerous black bristles of the frons and thorax.

Type ♂ and type ♀ a single couple from Namaqualand, Springbok (Cape), November, 1890 (R. M. Lightfoot); an additional male specimen from O'Okiep (Cape) (L. Péringuey).

Length of body 8-9 mm.; of wing expanse 19-24 mm. Head entirely black, dusty-grey, but rather shiny around the vertex; occiput rather developed, clothed with long greyish hairs and with long dark



brown or black bristles, more numerous in the female; these hairs become shorter and whiter below, and besides the eye-borders show a broad band of silvery scales. Eyes of the male of smaller size, with equally small areolets, and more separated than in the other species, their distance at the narrowest point being three times as broad as the breadth of the ocellar triangle; frontal triangle very broad and not triangular, clothed with very long and erect, bristly, black hairs, and with short, silvery, scaly hairs on the front half, continued on the cheeks; face clothed with long white hairs, and with numerous, long and strong curved bristles of a white colour, some of which near the middle are black. In the female the frons is exceedingly broad,  $2\frac{1}{2}$  times as broad as the eye; on the first half it is clothed with short white hairs, on the basal half it is bare and rather shining, and there and also on the sides it bears very numerous erect black bristles; face with white hairs and scaly silvery ones near the eye-borders, with numerous and strong white bristles and 2-3 black ones near the middle and on the sides above. On the genae there are no distinct bristles in either sex; the genae and the lower part of the cheeks are provided with long white hairs. Antennae entirely black, with the first joint long, almost 4 times as long as the globular second joint, with long black hairs and some black ones intermingled; third joint not longer than the two first joints taken together, slender, linear, less broadened at the base. Proboscis entirely black, 4.5-5 mm. long, the basal ring, like the peristome, with a yellow border; palpi very thin, black, almost bare, with a few dark hairs near the end. Thorax black, a little shining, with a faint dark-grey dust, clothed with long greyish hairs, which, viewed from the front, are shining white, and on the pleura and breast with quite white hairs. There are very numerous black bristles forming a complete row on the fore border, another row on the sides from the humeri to the postalar cell, a rich tuft below the notapleural line and a row at the hind border of the mesopleurae. Scutellum dark red, with black base and black hind border, clothed like the thorax, and with long black bristles on the disc and on the hind border. Squamae dirty white, with a narrow dark border and with a white fringe; halteres yellowish; metapleural tuft white. Abdomen entirely black, with a very long pubescence coloured like that of the thorax, and strongly tuft-shaped; on the hind borders of the segments there are complete rows of very numerous and long black bristles. Venter black, with white hairs and numerous black bristles; chiefly towards the end of the abdomen the bristles are exceedingly numerous, long, and intricate. Legs pale yellow, with the last joint of the tarsi black; the femora are black with yellow end, but are closely covered

with dense white scales and have white hairs below near the base; all the spines are well developed and yellow, there are none on the front femora, 3-4 on the middle femora, 6-7 on the hind femora; claws black, with red base; pulvilli very short. Wings greyish hyaline, with a suffused fuscous fringe along the fore border and near the base, more extended in the male than in the female and ending in the marginal cell at the end of the first vein. Basal comb black, with white tomentum near the base; alula almost hyaline, with pale fringe; discoidal cell with parallel sides, as broad as the middle of the first posterior cell, its terminal vein being longer than the discal cross-vein; second posterior cell as long as the discoidal cell, which is somewhat short.

*ANASTOECHUS MACROPHthalmus*, Bezzi.

Nearly allied to the preceding species, but distinguished by the closely approximated eyes of the male, and by the bristles of the head and thorax being yellow instead of black.

A single rather old and discoloured male specimen from Hex River (Cape), December, 1884 (L. Péringuey). Type is described by me from Willowmore (Cape) in the Museum at Budapest.

*ANASTOECHUS INNOCUUS*, sp. nov. ♂, ♀.

A smallish oblong, less bristly species, making a passage to the following on account of the small and entirely white basal comb of the wings.

Type ♂ and type ♀, a single couple of specimens from Van Wyk's Vlei (Cape) (E. G. Alston).

*Male*.—Length of body 8-8.5 mm.; of wing expanse 7.5-8 mm. Head black, but entirely clothed with dense hairs, which on the occiput are rather long, pale yellowish above and whitish below; lower border of the eyes with silvery scaly hairs; ocellar tubercle with yellowish hairs. Eyes of the male more broadly separated than in the preceding species, the frons at the narrowest point being as broad as the ocellar triangle; the upper areolets are a little broader than the lower ones. Frontal triangle at the base and on the middle with scarce, erect, dark hairs, and in front around the base of antennae with long yellowish hairs, mingling with those of the same colour which cover entirely the face concealing the mouth opening and of a white colour below; between this dense pubescence there are no bristles at all. Antennae entirely black, the first joint three times as long as the second, with dense pale yellowish hairs; third joint linear, narrower than the

second at the base, with the terminal part less attenuated. Proboscis entirely black, 4 mm. long, its basal ring with yellow border like the peristome; palpi blackish. Thorax black, faintly shining, clothed with dense and equal, rather long hairs which are light yellowish and shining silvery on the back and whitish on the pleura and below; there are no bristles in front, and the notopleural and postalar bristles are thin and yellowish. Scutellum dark red on the disc, black at the base and on the borders, clothed, like the thorax, with indistinct bristles at the hind border. Squamae dirty white, with yellowish border and with whitish fringe; halteres yellow, with whitish knob. Abdomen elongate, black, rather shining; the narrow lateral border (not the hind border of the segments) and the venter are red; it is clothed with dense and long soft hairs, which are coloured like those of the thorax, but are paler on the sides and at end, becoming white on the venter. The bristles at the hind border of the segments are well developed only on the last segments, and are thin and of a darker brownish-yellow colour; the fur is not tuft-like; on the venter there are no distinct bristles. Legs pale yellow; the femora are black, with only the tip yellow, more broadly so on the 2 anterior pairs, but they are clothed with white scales and with white hairs below near the base; all the bristles are thin and of a whitish colour; front femora without any, middle femora with 2, hind femora with 4-5 spines below; claws black, with a red base; pulvilli almost wanting. Wings entirely hyaline, the extreme base and the costal and first basal cells with a less distinct greyish tinge; basal comb small, with entirely white bristles; alula hyaline, white fringed; veins reddish-yellow, darkened at end; discoidal cell less obtuse, with the terminal vein only a little longer or as long as the discal cross-vein; first posterior cell narrower than the discoidal cell, which is a little longer than the second posterior cell.

*Female*.—Length of body 5.5 mm.; of the wing expanse 14 mm. Doubtfully the same species, but taken at the same place and time with the male, and half the size of it. Frons exceedingly broad, three times as broad as the eye, with numerous bristles on the sides, which are of a dark yellowish-brown colour; on the face there are no distinct bristles, but only a few bristly hairs of the same colour as the surrounding pubescence; the antennae are of the same shape as in the male, but the first joint is pale yellow. Thorax as in the male, but with numerous yellowish bristles below the notopleural line. Abdomen with more numerous, stronger and longer dark bristles, which, however, are set only at the end; in the middle the rows are incomplete. Legs and wings exactly as in the male.

## ANASTOECHUS LEUCOSOMA, sp. nov., ♀.

An elegant species of small size, distinct from any other owing to the body being clothed entirely with long silvery hairs, without distinct bristles even on the abdomen, and by the vitreous wings, which have a silvery basal comb.

Type female, Bushmanland, Jackal's Water, October, 1911 (R. M. Lightfoot); O'Okiep (Cape), November–December; a specimen from Matjesfontein (Cape) is much larger, measuring 8.5 mm. in length. The present species was named by Bigot *Systoechus leucosoma* in M.S.; I have retained the very appropriate specific name.

Length of body 5.5–6.5 mm.; of wing expanse 13–16 mm. Head black, but densely clothed with silvery scales at the hind border of the eyes and on the sides of frons and face; on the vertex only there is a broad transverse black band clothed with erect black hairs enclosing the ocelli and extending from one eye to the other, like those of the ocellar tubercle; all the other hairs are silvery, long and dense, chiefly on the upper part of the occiput and on the face; there are no distinct bristles; the frons is twice as broad as the eye. Antennae entirely black; the first joint long and clothed with long, white hairs; the third joint linear, restricted to a long and thin petiole at the base, not broader in the middle than the second joint, and less attenuated at end. Proboscis as long as the body, 6–6.5 mm. long, thin, entirely black; palpi black, thin, with same long white hairs at the end. Thorax short and rather arched above; entirely clothed with long silvery hairs, those of the disc being only slightly dark if viewed from the side or from above; there are no distinct bristles, the notopleural and postalar ones being concealed within the fur, from which they cannot be distinguished. Scutellum entirely black, clothed like the thorax, and likewise destitute of bristles. Squamae white, with pale yellowish border and with argenteous fringe; halteres yellowish. Abdomen entirely black, with long hairs like those of thorax; the bristles at the hind border of the segments are thin and of the same colour as the fur, from which they are not distinguishable; venter black, yellowish at end, with shorter white hairs; the genitalia are destitute of the usual tuft of hairs, but have two approximate lamellae with a longitudinal fissure between them. Legs short and strong, with well-developed spines of a white (not yellow, as in the other species) colour; they are clothed with broad silvery scales, which are developed chiefly on the femora, but are abundant even on the tibiae. The femora are black, those of the two anterior pairs with the apical half pale yellow and those of the hind pair with the end yellow; the anterior and middle

femora have also white hairs below near the base, but are destitute of spines; the hind femora have 3-4 long spines below; tibiae and tarsi pale yellow, but those of the hind pair are distinctly darker. Claws black, with narrowly yellow base; pulvilli nearly wanting. Wings entirely vitreous, only a little whitish at the extreme base and along the fore border; basal comb very small and silvery; alula with a white fringe; veins pale yellow, darkened at end. Discoidal cell short and obtuse at end, its apical vein being longer than the discal cross-vein: it is as long as the second posterior cell and much broader than the narrow and elongate first posterior cell, the veins of which are almost entirely parallel.

EURYCARENUS, Loew (1860).

The species of this characteristic and rather aberrant genus seem to be more abundant in mid-Africa. The present collection contains only a few specimens of the typical species, and in addition there is a couple of specimens of a new form from Mozambique.

EURYCARENUS LATICEPS, Loew (1852).

Dipteren-Fauna Sudafrikas, p. 187, pl. ii, fig. 7.

A very distinct species on account of its generic characters.

A male from Morokweng (Bechuanaland) (J. M. Bain): a female from M'Fongosi, Zululand, December, 1914 (W. E. Jones).

EURYCARENUS SESSILIS, sp. nov., ♂, ♀.

Nearly allied to the preceding, but distinct from it and from any other species owing to the silvery abdominal bands and the very briefly stalked, almost sessile first posterior cell.

Type ♂ and type ♀, a single couple of specimens from Inhambane, Mozambique; an additional male example from Bechuanaland (G. Alston).

Length of body 8.5-9 mm.; of a wing 8-8.5 mm. Head black, with whitish-grey dust; occiput flat, with silvery tomentum on the sides beyond the lateral sinuosity of the eyes, and with white shiny hairs above; ocellar tubercle black-haired. Eyes of the male with the upper areolets broader, united on a line as long as the length of the ocellar tubercle; frontal triangle broad, with rather dense, erect black hairs, and a few whitish-dusted in front; frons of the female broad, one-third as broad as the head, yellowish-dusted, whitish near the eye borders, with sparse black hairs near the antennae, and with 4 strong, black, orbital bristles on each side, the apical one bent forwards, the

other backwards. Face broad, with a white tomentum on the sides and below, and with white hairs and a few black ones in the centre of the sides; genae with white hairs underneath; antennae entirely black, the basal joint with black hairs, the third joint long, narrow and pointed as in *laticeps*, but the upper ciliae seem to be caducous.

Proboscis entirely black, 3.5-4 mm. long; palpi not visible and seemingly less developed than is usual. Thorax and scutellum entirely black, with yellow pubescence, pale yellowish hairs and strong black bristles, which are numerous before the root of the wings and at the hind border of the scutellum; pleurae and breast with white hairs; metapleural tuft well developed. Squamae pale yellowish, with a dark border showing short black bristly hairs and a white fringe of moderate length. Halteres with blackish stalk and whitish knob. Abdomen entirely black; it is clothed with long white pubescence and has some black hairs at the base of the segments on the sides; very characteristic are the narrow bands of silvery tomentum on the hind border of the segments from the 2nd to the 6th; on the hind border of the segments there are besides complete rows of very strong and numerous black bristles; there is no trace of the white longitudinal stripe of *laticeps*; venter black and black haired, with a broad white transverse band in the middle; male genitalia black and black haired. Legs entirely black, with dark yellowish tibiae and basal joints of tarsi; in the female only they are white-scaled on the femora and the tibiae, but those of the hind pair have black scales on the apical half of the femora and the tibiae; the coxae and the 4 anterior femora are white-pilose near the base; all the spines are black, those of the tibiae well developed even on the front pair; middle femora with 4-5, hind femora with 10-12 spines below; claws black, with narrowly yellow base; pulvilli dark, as long as the claws. Wings greyish-hyaline, pale yellowish at base, with the black basal spot less developed; they have the typical venation of *laticeps*, with this exception, that in both sexes the first posterior cell has a very short stalk, being extended almost to the hind border, as in the genus *Sisgyrophanus*. Alula hyaline, whitish fringed; praealar hook strong, of a deep black colour; basal comb small, black, yellow tomentose; veins dark, yellow at base, especially the auxiliary and the sixth; base of the first and of sixth vein with a broad yellow pubescence.

#### DISCHISTUS, Loew (1855).

The present genus is rich in species provided with important characters. It can be divided in groups, like those of the genus *Bombylius*. Of these groups, only two are characteristic of the South African

Fauna, viz. the groups of *mystax* and of *seriatus*; and only these two are indeed represented in the collections of the South African Museum. Some species previously included in the genus will be removed to the new genus *Gonarthrus*. All the species here enumerated have the eyes of the male separated or only approximate; they can be distinguished as follows:

- 1 (4). Species of great size and of broad, stout body; metapleuræ bare; antennæ widely separated at the base, with the first joint thickened; hind femora without bristles below, only with rigid black hairs; tibiae with black spicules; wings short, with the discal cross-vein placed much after the middle of the discoidal cell; upper branch of the cubital fork less retreating; alula small and not fringed (group *mystax*).
- 2 (3). Proboscis short, not longer than the thorax; palpi concealed; femora black, with only the end yellow and with numerous rigid black hairs below . . . . . *capito*, Loew.
- 3 (2). Proboscis as long as the body; palpi long and feathered; femora yellow, without black hairs below, or only with a very few thin ones on the hind pair. . . . . *plumipalpis*, sp. nov.
- 4 (1). Species of small size and of more elongate body; metapleuræ haired; antennæ approximate at base, with non-thickened first joint; hind femora with yellow bristles below; tibiae with yellow spicules; discal cross-vein set much before the middle or rarely in the middle of the discoidal cell; upper branch of the cubital fork much retreating, alula broad and fringed (group *seriatus*).
- 5 (6). Wings very short, with the discal cross-vein placed on the middle of the discoidal cell, which is short and broad, triangular; the two basal joints of the antennæ, scutellum and legs entirely of a yellowish-red colour; pulvilli long . . . . . *rubicundus*, sp. nov.
- 6 (5). Wings of usual length, with the discal cross-vein set much before the middle of the discoidal cell which is variable in shape; base of the antennæ, scutellum and legs never completely yellow at the same time; pulvilli usually much shorter than the claws.
- 7 (8). Antennæ, scutellum and legs entirely black; discoidal cell as long as broad; body clothed with silvery long hairs and below these with yellow tomentum . . . . . *niveus*, Macq.
- 8 (7). Legs mainly yellow, at least on the tibiae; discoidal cell elongated, often very much longer than broad.
- 9 (14). Proboscis entirely black; frons in the known females narrow.
- 10 (13). Scutellum black; proboscis short; wings small, entirely hyaline; discoidal cell rather short, not twice as long as broad; femora not black striped.
- 11 (12). Femora entirely yellow, without distinct spines below; wings with rather distinct basal comb . . . . . *ovatus*, sp. nov.
- 12 (11). Femora black, with distinct bristles below on the hind pair; wings with no distinct basal comb . . . . . *seriatus*, Wied.

- 13 (10). Scutellum red; proboscis long; wings very broad and long, and broadly infuscated; discoidal cell almost three times as long as broad; basal comb developed; femora with black stripes below.  
*vittipes*, sp. nov.
- 14 (9). Proboscis red above, at least near the base; frons of the known females very broad.
- 15 (16). Scutellum red; body grey, with pale or white fur; basal comb of the wings rather developed. . . . . *variegatus*, Macq.
- 16 (15). Entire body and scutellum of a deep black colour with dark reddish fur; basal comb smaller . . . . . *tripunctatus*, Macq.

## DISCHISTUS CAPITO, Loew (1860).

A species of great size (for the present genus), very near *mystax*, but at once distinguished from it and from the others by the characters given in the table.

Originally described from Caffraria. There is in the collection a male specimen from Grahamstown, May, 1885 (Billingham), measuring 12 mm. of length with 25 mm. of wing-spread; it was named by Bigot *Dischistus heterocerus*, Macq.; but Macquart in its description says that the third antennal joint is spindle-shaped and that the legs are yellow—characters which apply better to *mystax*, with which therefore it must be placed as a synonym.

The male was unknown to Loew and is hitherto undescribed; it is very like the female. The eyes have equally small areolets, and are set close to each other on the frons but separated for a distance which is as broad as the ocellar tubercle; the genitalia are black, with reddish borders to the lamellae; the black bristles of the abdomen form complete rows and are very numerous. All the femora are provided on the underside with long and numerous, rigid, black hairs, with some yellow ones intermingled chiefly near the base and on the middle pair. The pulvilli are only a little shorter than the claws. Wings with the discoidal cell long, the two middle segments of its lower vein being of equal length; basal comb not distinct; alula very small and destitute of fringe.

## DISCHISTUS PLUMIPALPIS, sp. nov., ♂.

Closely allied to *mystax* and *capito*, but at once distinguished by the long proboscis, the feathered palpi and the much more approximate eyes of the male.

Type ♂, a single specimen from Grahamstown (Cape), 1883.

Length of the body 10.5 mm.; spread of the wings 22 mm. Head black, grey-dusted; occiput flat, concave in the middle, with rather



long yellowish hairs at the upper border, which become shorter and paler below, but along the whole ocular border, in front of these hairs, there is a fringe of thin but distinct black ones. Ocellar tubercle black, with a tuft of long black hairs; eyes with the upper areolets distinct but little broader than the others; they are greatly prolonged above, approaching each other to a distance which is only a little broader than the breadth of the fore ocellus. The frontal triangle is very short and very broad, with short yellowish hairs on the middle and with dark ones on the sides; cheeks clothed with long, reddish hairs forming a rich moustache, but margined near the eyes with black hairs; below this moustache are to be seen the rather broad, shining black and bare mouth borders. Beard very dense, becoming longer behind, of a dirty whitish colour. Antennae entirely black, rather separated at the base; first joint long, grey-dusted and distinctly thickened, clothed with very long and dense hairs which are pale yellowish above and reddish below, with some black hairs intermingled; second joint globular; third as long as the first, but much thinner (almost spindle-shaped as in *mystax*), but less narrowed at the base, its terminal half being very thin, with a short capillar style at the end. Proboscis entirely black, very long and thin, with small terminal labella, 11 mm. long; palpi very long, as long as the antennae, black, feathered with long and dense, rigid hairs which are black above and at apex, whitish below, and also at the base. Thorax and scutellum entirely of a deep black colour, clothed with dense, equal yellowish hairs of moderate length; on the pleurae the hairs are paler and those of the breast are whitish, but the metapleura is bare, concealed below the squamae and the mesopleural tufts; there are distinct, but thin, bristly, black hairs at the posterior end of the thorax and on the hind border of the scutellum. Squamae dirty-whitish, with dark brown border and very long and dense whitish fringe; halteres with a white knob. Abdomen entirely deep black, clothed with hairs like those of the thorax, whitish-shiny from a front view; the black bristles at the hind border of the segments are very numerous, forming complete rows, but they are very thin; venter with greyish hairs and without bristles; genitalia black. Legs entirely pale yellow, but the tarsi broadly black at the end and the femora narrowly darkened at the base: they are pale-dusted, and the femora have very long white hairs below, but only a few thin black hairs and no spines; the spicules of the tibiae are very long and numerous; claws red with black end; pulvilli dirty-whitish, a little shorter than the claws. Wings very short, entirely hyaline; only at the extreme base and in the costal cells have they a faint yellowish tinge; veins

yellow, darkened at end; no distinct basal comb; linear alula very narrow, not fringed, venation typical of the group.

DISCHISTUS RUBICUNDUS, sp. nov., ♂.

A species of middle size, with elongate body and short wings, very distinct owing to the colour of the antennae and legs, and by the typical venation. The present species in coloration, shape and disposition of the abdominal fur strongly recalls *Bombylius mundus*, Loew, and some other species of the same group, which were taken in the same locality and at the same time; even the specimens of *D. rubicundus*, Wied., from the same locality, have a very similar facies.

Type, ♂; a single specimen from Bushmanland, Jackal's Water (Cape), October, 1911 (R. M. Lightfoot).

Length of the body 9 mm.; of a wing 6.5 mm.; spread 17 mm. only. Head black, with dense grey dust; occiput much developed, swollen, clothed with short and dense pale yellowish hairs, which below are very short and become tomentose near the borders of the eyes; no black hairs behind; ocellar tubercle less prominent with pale hairs; frons as broad as the ocellar tubercle, moderately broadened forward, with dense yellow hairs. Face and cheeks with entirely yellow hairs forming a scarce and short moustache, the lower hairs being rigid and paler; beard scarce and short, whitish. Eyes dark red, with irregular black spots and with equally small areolets. Antennae approximate at the base, rather strong; first joint of a pale reddish colour, with sparse hairs, which are very short and whitish above, very long and yellowish below, forming a tuft; second joint of the same colour as the first, and twice as long; third joint deep black, as thick as the first, truncate, very little attenuated at the extreme end, of even shape throughout; terminal style very thin. Mouth-opening broad; proboscis short and strong, 2.5 mm. long, black above, dark red below near the base, glabrous at end; palpi yellow, thin, pale-haired. Thorax black, densely clothed with very short pale yellowish hairs; it seems that on the back there are 4 longitudinal stripes of more yellow pubescence, more distinct on the posterior half; pleurae grey-dusted, with short hairs and with some bare parts, but the metapleura with a fine, whitish tuft; the bristles are long, yellow; below the notopleural line, on the upper part of the pleurae, there is a dense tuft of short, yellowish, bristly hairs. Scutellum red, black at base, grey-dusted, clothed like the thorax with strong but short pale bristles on the hind border. Squamae dirty pale-yellowish, with whitish fringe; halteres

yellow, with white knobs. Abdomen ovate, red, the two first segments and the middle of the third black; it is clothed with dense, whitish, depressed pubescence; at the hind border of each segment there is a broad band of erect, pale yellowish hairs, but there are no distinct bristles; the long abdominal fur appears thereby to be disposed on 5 parallel rows alternating with tomentose bands; venter red, with short whitish hairs; genitalia red. Legs entirely reddish-yellow, even on the coxae and at the end of the tarsi; they have whitish scales and very scarce pale hairs on the femora; middle femora with 4, hind femora with 6 yellow spines underneath; spicules of the tibiae yellow, those of the front pair very minute; claws red, with black end; pulvilli narrow, dirty-whitish, shorter than the claws. Wings short, with a faint yellowish tinge on the basal half; veins yellow; basal comb very small, pale yellowish; alula broad, rounded, hyaline with pale fringe. Upper branch of the cubital fork arched in the middle and much retreating at base; discal cross-vein on the middle of the short and broad discoidal cell, which is of triangular shape, with the two lower veins of nearly equal length; first posterior cell narrowed at end, but the second posterior cell not triangular; apical cross-vein of the discoidal cell much longer than the discal cross-vein.

A very small female specimen (only 4 mm. in length) from Namaqualand, O'Okiep, 1885 (L. Péringuey), has the frons with parallel sides and about as broad as the eye; the thorax is black on the back, with 4 longitudinal greyish stripes, 2 of which are on the dorso-central lines and 2 on the sides; abdomen with rather distinct pale yellowish bristles at hind border of the segments.

#### DISCHISTUS NIVEUS, Macquart (1840).

A small species, very distinct on account of its entirely black legs and its white fur.

Macquart described the male from the Cape, but without mentioning the colour of the legs; from his short description it seems to be a species of *Gonartherus*, but the position of the discal cross-vein differs. I refer to this species a female specimen from Bushmanland, Jackal's Water (Cape), October, 1911 (R. M. Lightfoot).

Length of body 6 mm.; of a wing 5.5 mm. Head, thorax, scutellum and abdomen black, grey-dusted and clothed with a short golden tomentum, which is silvery only on the face and at the hind borders of the eyes. All the hairs are long, but rather sparse, of a silvery white colour; on the pleurae there is no golden tomentum, only white scaly hairs and no distinct bristles between the hairs. Frons much

broadier than the eye. Antennae entirely black, the third joint one and a-half times as long as the two first taken together, linear, obtuse, thinner than the rather thin, short and white-haired first joint. Proboscis entirely black, 3.5 mm. long. Halteres whitish. Legs white-scaled, with white spines and white spicules; claws black; pulvilli absent. Wings entirely hyaline, vitreous, with pale yellow veins, no distinct comb, but the costa is white-scaled at the base; alula broad, rounded and fringed with white. Upper branch of the third vein very much retreating at the base; discal cross-vein placed much before the middle of the discoidal cell, which is as broad as long, triangular; first posterior cell not narrowed at end; anal cell sometimes narrowed at end.

DISCHISTUS OVATUS, sp. nov., ♂.

A dark species with long ovate body, recalling that of *Bombylius kilimandjaricus* and differing from the other species of the present group in having the hind femora not spinose below.

Type ♂, a single, not well-preserved specimen from the Cape, without special locality.

Length of body 11 mm.; of wing 10 mm. Head dark-tawny, grey-dusted, black on the occiput; this last little developed, clothed with short and dense black hairs above which become very short and brownish below and merge into the less developed beard of a paler colour; ocellar tubercle black-haired. Eyes with equally small areolets, less approximated, the frons at the narrowest point being as broad as the vertical triangle; it is less broadened forwards, and bears sparse and short, erect black hairs; face gently rounded, clothed like the cheeks with sparse black hairs, with some shorter yellowish ones intermingled. Antennae entirely black, but the first joint pale-dusted, three times as long as the second, clothed on the two sides with long black hairs; third joint as long as the two first joints taken together, not broader at the base than the second, gradually tapering to a short point. Proboscis entirely black, rather thick, 4 mm. long. Thorax, scutellum and abdomen deep black, clothed with rather short dark brownish hairs, which, viewed from the front, are shining-pale; there are no black hairs intermingled; the bristles at the postalar cells and at the hind border of the scutellum, like those of the hind border of the abdominal segments, are black and well developed. Pleurae below and breast with greyish hairs; metapleurae with whitish and black hairs intermingled. Squamae tawny, with short whitish fringe; halteres yellowish-brown. Venter black, reddish-yellow at base, grey-haired; genitalia dark red. Legs

with the coxae entirely yellow, pale-scaled, scarcely white-haired on the femora, which are unarmed, and having even on the hind pair only a few rigid hairs; spicules of the tibiae less developed, yellow, claws yellow, with black point; pulvilli not distinct. Wings vitreous, hyaline, faintly yellowish at base and along the costal cell; basal hook strongly reddish; basal comb distinct, black, yellowish tomentose; alula broad, yellow-fringed. Veins black, but the entire first vein and the base of the others are yellow; upper branch of the cubital fork retreating; first posterior cell narrowed at end; discoidal cell short and broad, truncate at end, its terminal vein being longer than the discal cross-vein, which is placed before the middle; the two lower veins of the discoidal cell are of almost equal length.

*DISCHISTUS SERIATUS*, Wiedemann (1821).

Closely allied to the preceding species, from which it is distinguished by the smaller size, the darker legs and the well-developed spines at the underside of the hind femora.

A very small male specimen, measuring only 5 mm. in length, from Van Wyk's Vlei, Carnarvon (Cape) (E. G. Alston), 1893. Wiedemann has described the female from the Cape; the eyes of the male have equally small areolets and are approximate to a distance equal to the distance of the posterior ocelli. Proboscis short; genitalia dark red; abdomen mainly black-haired; pulvilli very short. Wings entirely hyaline; first posterior cell not narrowed at end and very long; discoidal cell obtuse at end, twice as long as broad.

*DISCHISTUS VITTIPES*, sp. nov., ♂.

A species of proportionally large size, having strongly spinose legs and broadly infuscated, very long wings, which have in addition a rather large basal comb.

Type ♂, a single specimen from Bushmanland, Jackal's Water (Cape), October, 1911 (R. M. Lightfoot).

Length of the body 10.5 mm.; of the wing 12 mm. Head reddish, grey-dusted, black on the occiput, which is developed and convex, clothed with pale yellowish hairs above, with whitish and shorter ones on sides and below, without any black hairs; beard scarce, white. Frons broad; eyes with equal areolets, less approximate, separated for a distance twice as broad as the ocellar triangle; ocellar tubercle with some dark hairs; frons little broadened forwards, with sparse dark hairs in the middle and other whitish and longer hairs on the sides. Face very broad and long, gently curved, clothed like the very narrow cheeks with scarce and long white hairs; genae

broad, red before and black beneath. Antennae dark reddish, but infusate above at the base and on the basal half of the third joint; first joint three times as long as the second, with sparse and short whitish hairs; third joint narrow, linear, a little longer than the first two taken together. Proboscis entirely black, 7.5 mm. long; palpi reddish-yellow, thin, almost bare. Thorax black, with red humeral calli; it is entirely clothed with dirty-greyish hairs having a white sheen if looked at from a front view; bristles long and entirely yellow; pleurae grey-dusted, the sternopleura with a broad red band above; they are whitish-pilose below and on the breast; sternopleura with a dense tuft of long pale hairs. Scutellum red, narrowly black at the base, clothed like the thorax with long whitish bristles at the hind border. Squamae yellowish, with white fringe; halteres yellow, with white knob. Abdomen short oval, black, rather shining, broadly red on the sides; it is clothed like the thorax and has whitish bristles at the hind border of the segments; genitalia reddish above, black below; venter red, each segment broadly black at the base, with sparse greyish hairs. Legs yellow, with the tarsi blackened at end; the femora have a well-marked black stripe below from the base to the end, and are provided with whitish hairs and strong yellow spines, 3-4 on the middle, 5-6 on the hind pair; spicules of the tibiae much developed, yellow; claws black, with a red base; pulvilli very short. Wings very long and broad: basal comb pale-yellowish, larger than usual; alula broad, hyaline, pale-fringed. The wings have only the apical third greyish-hyaline; the rest has a yellowish-brown infuscation which forms broad dark borders along the veins, the centre of the cells being paler. Veins black, the first entirely and the others yellow at the base; upper branch of the cubital fork retreating at base; first posterior cell narrowed at end; discal cross-vein set much before the middle of the discoidal cell, which is very long, being three times as long as broad, obtuse at the end and with parallel sides, the second of the lower veins being three times as long as the first; anal cell narrowed at end.

*DISCHISTUS VARIEGATUS*, Macquart (1840).

A species very distinct owing to the red proboscis, but closely allied to the preceding one; it is perhaps its female. Macquart has described the female from the Cape, and likewise there are in the collection females from Namaqualand, Springbok (Cape), October, 1890, and from Bushmanland, Jackal's Water (Cape), October, 1911 (R. M. Lightfoot). The present species show a very striking affinity with

*Bombylius brachyrrhynchus*, sp. nov., taken at the same time and in the same locality, and which has also a red proboscis.

The ground-colour of the head is reddish, but it is concealed below the white dust, which is very dense on the rather developed and prominent occiput; the soft hairs of the upper part of the occiput, the bristly hairs of the ocellar tubercle, and those, likewise bristly, of two tufts, set one on each side of the frons, are yellowish; the other hairs of the head are white or even silvery. Frons as broad as one-third of the head. Antennae reddish, more or less infuscated above; the basal joint with short yellowish hairs above and long white hairs below. Proboscis entirely red above and below, with a black tip; palpi pale-yellow, almost bare; proboscis 4 mm. long. Thorax black, clothed with yellowish and white hairs; pleurae reddish, white-dusted, with white and yellowish hairs; metapleurae with a tuft of white and yellow hairs. Scutellum red, hairy like the thorax, and with yellowish marginal bristles. Squamae brownish-yellow, white-haired; halteres yellow, with a whitish knob. Abdomen as in the preceding species. Legs as in the preceding and even more spinose, but the femora are not striped and only a little darkened below near the base; pulvilli well developed. The wings are very like those of the preceding species, but there is no broad infuscation in the middle; they are only yellowish near the base and along the fore border right to the basal and discal cross-veins, which are sometimes narrowly margined with fuscous.

DISCHISTUS TRIPUNCTATUS, Macquart (1840).

Distinguished by the red proboscis and red antennae, by the deep black body with dark fulvous pubescence and by the tripunctate wings.

The female was described as a *Bombylius* from an unknown country by Macquart. There is in the collection a male specimen from Namaqualand, Springbok (Cape), October, 1890 (R. M. Lightfoot). Notwithstanding the differences the present species also may prove to be the male of the preceding, as it was caught in the same locality and at the same time.

Length of the body 7 mm.; of a wing 7 mm. Head black, but densely clothed with a dark dust and by a short fulvous pubescence which is destitute of black hairs; occiput less developed; beard scarce and pale-coloured. Antennae approximate at the base, rather short, of a dark reddish colour; the first joint is more than 3 times as long as the second, and provided with tawny hairs; third joint a little more darkened above, linear, gradually attenuated, obtuse, not longer and

never thicker than the first, ending in a thin style. Proboscis short, 2 mm. long, red above with black tip, entirely black below or narrowly red only at the base. Thorax and scutellum of a deep black colour, clothed by an equal, rather short, dark fulvous pubescence, with long dark reddish bristles on the postalar calli and on the hind border; pleurae with more reddish hairs, reddish-dusted, almost bare below and on breast; metapleural tuft dense, of reddish colour. Squamae brownish, with short yellow fringe; halteres yellow. Abdomen ovate, deep black, but with dark-red sides and red genitalia; it is rather shining and has a bluish tinge on the middle of the tergites; it is clothed like the thorax with dark-reddish bristles at the hind border of the segments; venter red, with short hairs, pale at the base and reddish at tip. Legs pale yellow, with long fulvous hairs on the femora, well-developed fulvous spicules on the tibiae and 5 long fulvous spines on the under-side of the hind femora; claws red with black tip; pulvilli dirty-whitish, a little shorter than the claws. Wings hyaline, with a small but distinct fulvous basal comb; they are yellowish-fuscous near the base and along the costal cell; the 3 fuscous spots are as described by Macquart. Veins dark yellow, paler near the base; alula of great size, yellowish brown, with a pale fringe; upper branch of the cubital fork much retreating at the base; discal cross-vein set much before the middle of the discoidal cell. First posterior cell a little narrowed at end; discoidal cell long, with parallel sides, almost rectangular, its apical vein being almost twice as long as the discal cross-vein; anal cell broad in the middle and narrowed at end.

DISCHISTUS CORACINUS, Loew (1863).

An entirely deep black species of smaller size, at once distinguishable from all the other species here recorded on account of its entirely black hairs.

A male specimen from Pretoria, November 20th, 1916 (G. A. H. Bedford). This and the following species belongs to the group of *D. minimus*, a group which was believed to be very scarcely represented in the South African fauna. The present species was originally described from Bloemfontein. To the short diagnosis may be added: Eyes touching on a line longer than the frontal triangle; occiput not prominent, with rather long black hairs at the border; antennae entirely black, with the first joint a little inflated and black-haired, and with the third joint more than twice as long as the first, quite linear, with a short style at end. Proboscis entirely black, 1.5 mm.



long. Thorax without distinct bristles; hind border of the scutellum with thin and long bristly hairs; squamulae black, and black-haired. Abdomen with long bristly hairs at hind border of the segments. Coxae black and black-haired; hind femora with 2 spines below on the apical half; all the spines and the spicules of the legs are black. Wings with no distinct basal comb; 2nd longitudinal vein straight and gently curved at end; upper branch of the 3rd longitudinal vein long and oblique, a little S-shaped, not retreating; small cross-vein considerably before the middle of the discoidal cell; third posterior cell of a regular trapezoidal shape; discoidal cell rather broad.

DISCHISTUS PECTORALIS, Loew (1863).

A middle-size species of an entirely deep black colour, but clothed with a yellowish furriness which is black only on the breast. A male specimen from Pretoria, December 12th, 1916 (G. A. H. Bedford). Originally described from Bloemfontein, it is closely allied to the preceding species, being distinct by the greater size, the yellowish fur-like pile of body, the broadly yellow ends of femora and the yellowish base of wings. I have not succeeded in finding characters of distinction between the present species and the West African *D. senegalensis*, Macq.

Proboscis entirely black, 3 mm. long; palpi black; occiput a little prominent, with yellowish hairs, those of the hind border being darkened. Thorax, scutellum and abdomen without distinct bristles; mesopleurae with some black hairs; squamulae dirty whitish, with whitish fringe; halteres whitish. Hind femora with a complete row of 4-5 long spines below; spicules of the tibiae long and black. Venation as in the preceding species, but the upper branch of the cubital fork is shorter and more straight, and nearly parallel with the hind border of the wing.

SOSIOMYIA, gen. nov.

This new genus has a striking resemblance to *Adelidea anomala*, from which its type-species is at once distinguished by the conspicuous bristles of the third antennal joint and by the black femora. I believed at first that the present insect might prove to be *Adelidea fuscipennis* of Macquart because this last species is different from *Sobarus anomalus* as pointed out by Loew. But Macquart says nothing of the bristles of the third antennal joint, which are, moreover, more developed than in the genus *Acreotrichus* of the same author;

the figure also lacks these bristles; and besides, in the description of *A. fuscipennis* we read "*pedibus flavis*," and "*petite nervure transversale située aux deux tiers*": two characters which applied to *A. anomalus*, but not to the present species. It is therefore certain that Macquart had not *Sosiomyia* before him when describing *Adelidea*.

I have no hesitation therefore in describing the new genus, the name of which (from *Sosias* and *myia*) is an allusion to its deceptive resemblance to *Adelidea anomala*; and it is very curious that the present collection has no representatives of the last species, which does not seem to be rare in South Africa.

Body short and broad, rotund. Head narrower than the thorax. Occiput rather developed, swollen, provided in the female with bristly hairs. Ocelli disposed in an equilateral triangle, on a little prominent tubercle. Eyes with equally small areolets in both sexes, approximate in the male, very distant in the female; the frons in the male at the narrowest point is as broad as the distance between the two basal ocelli; in the female it is one and a half times as broad as the eye, with parallel sides and with numerous bristles. Face broad in both sexes, rounded, less prominent, without bristles, genae rather narrow, without bristles. Antennae approximate at the base, and of a very peculiar and characteristic shape; first joint a little, yet distinctly thickened, twice and a half as long as the second, with long hairs directed forwards; second joint globular; third as long as the first two together, broad at base in the male, gradually tapering to a point but deeply excavate below near the middle; in the female the basal two thirds are very broad and ovate, much broader than the second joint, the apical third is abruptly attenuated, linear in both sexes, truncate, with a thin and short style above, and having below near the end a tuft of 7-10 rather long hairs; near the base it is provided above with 4-6 very long and strong bristles, directed forwards and nearly reaching the end of the joint. Mouth-opening broad and short; proboscis short, not longer than the thorax, strong, with broad and long, lanceolate terminal labella; palpi concealed. Thorax with very numerous long bristles on fore border (more developed in the female) and on the sides; some shorter bristles are present even on the back; pleurae less pilose; metapleura bare. Scutellum with numerous and long marginal bristles disposed in three irregular rows on the hind border; abdomen short and broad, with the bristles at the hind border of the segments forming complete rows. Legs stout, with the femora spinose beneath; tibiae with much developed and strong spicules; claws curved; pulvilli as long as the claws. Wings long and rather narrow. Praealar hook short and acute; basal comb very small, but distinct;

alula rounded, of moderate size, but destitute of fringe. Second longitudinal vein gently curved at end, the marginal cell being broad at end; three submarginal cells present; upper branch of the cubital fork much retreating at base, the cross-vein dividing the first submarginal cell being situated near its base and distinctly longer than the part of the third between it and the origin of the fork; first posterior cell not narrowed, as broad at end as in the middle; discal cross-vein after the middle of the discoidal cell, but not so much as in *Adelidea*. Discoidal cell triangular at base, truncate at end and there with parallel sides, its terminal vein being as long as the discal cross-vein; the two lower veins of the discoidal cell are of equal length, but form a deep angle in the middle at their junction; second posterior cell narrow and long, rectangular, the third being much broader. Anal cell narrowed at end; axillary lobe well developed, but very little prominent; ambient vein complete. The wings are besides strongly pilose at the base from the first to the sixth vein, which is not the case in *Adelidea*.

Type: the following new species.

*SOSIOMYIA CARNATA*, sp. nov., ♂, ♀.

A strange fly, very like *Adelidea anomala*, but distinguished, besides the generic characters, by the darker general coloration, by the legs having black femora and partly black spicules on the tibiae, and by the different pattern of the wings.

Type ♂ and type ♀, a single pair from the Cape, without precise locality.

Length of the body 6.5–7 mm.; of a wing 8 mm.; spread 20 mm. Head entirely black, even on the mouth borders, grey-dusted, with some golden tomentum on the upper border of the occiput and on the frons; hairs of the occiput of middle length, golden yellow above, white and shorter on the sides and below; beard long, but not dense, white; hairs of the ocellar tubercle black. Frons in the male with a few black hairs over the golden tomentum in the narrowed basal half; densely clothed in the apical half with pale yellowish hairs which are directed forwards and outwards. The numerous bristles of the frons of the female are golden-coloured and only near the antennae are yellowish hairs. Face and cheeks in both sexes whitish-dusted and with long white hairs, which only on the upper part are pale yellowish. Antennae entirely black, grey-dusted: the hairs of the first joint are partly yellowish and partly golden; those of the third are also pale-

yellowish, but the strong bristles of the base are black in the male and dark-golden in the female. Proboscis entirely black, 3 mm. long. Thorax and scutellum black, densely bluish-grey dusted; they have a scarce but well-developed golden tomentum on the back, and are clothed with erect, rather long and scattered dark hairs, with some shorter pale ones and very numerous and very long golden-red bristles. The pleurae are densely pale grey-dusted, and have scarce white hairs below and on the middle, being bare on the metapleura and on the surrounding parts; the mesopleural bristles near the root of the wings are golden like those of the back. Squamae brownish black, grey-dusted with yellow fringe. Halteres yellow, with paler knob. Abdomen black, dusted-pollinose, pubescent like the thorax and provided with golden-red bristles; on the sides are numerous yellow hairs intermingled with the dark ones. Male genitalia small; concealed, black, yellow-haired. Venter entirely black, grey-dusted, without the yellow hind borders of *A. anomala*, clothed with white hairs. Coxae and femora black, the former with long white hairs, the latter whitish pubescent, with some white hairs below at the base and with yellow tips; their spines are strong and long, yellow, 2-3 on the middle, 5-6 on the hind pair. Tibiae and tarsi pale yellow, only the last tarsal joint being black or darkened, with long and stout spicules, even those of the front pair, the spicules being in great part black, but those of the inner side are yellow. Claws yellow, with black tip; pulvilli dirty-whitish. Wings greyish-hyaline, with the base and the fore half infuscated; the fuscous spots are more numerous; and more distinct than in *anomala*. There is a broad quadrate spot on the discal cross-vein, extending above almost to the second vein and preceded by a hyaline space of equal size; two united spots at the base of the cubital fork and of the cross-vein delimiting the upper submarginal cell; a spot on the vein at the end of the discoidal cell; another at the extreme basal angle of the third posterior cell and a third at the base of the fourth posterior cell; there is besides a rounded spot before the end of the anal cell, of which there is no trace in *anomala*. The second basal cell has a rounded whitish spot above before the base of the discoidal cell, which is not distinct in *anomala*. The alula is dark brownish, like the squamae and the extreme base of the wings; the small basal comb is black, but densely golden yellow-tomentose and white pubescent at base, this last pubescence extending to the base of the sixth vein. The veins are dark yellow, but the first and the costa to the end of the upper branch of the cubital fork are pale yellow; the costa is golden-tomentose.

## SUBFAMILY CYTHEREINAE.

### ONIROMYIA, gen. nov.

An aberrant genus, apparently allied to *Amictus* on account of the narrow and short wings with similar venation, but distinct by the different antennae, absent ocelli, absent abdominal macrochaetae and haired metapleurae. Owing to the shape of the occiput the genus must be placed in the *Cythereinae*, notwithstanding the approximate antennae; the form of these organs agrees with that of *Peringueymyia*, from which it is differentiated by the narrow elongate body with conical abdomen and by the very different venation.

Head of female (the male being still unknown) a little broader than the thorax; frons broad, broader than one third of the head, with parallel sides and long hairs; occiput flat, not bilobed above, briefly pilose, without ocular fringe; no ocelli and no ocellar tubercle; there is instead a depression in the form of a shallow furrow. Eyes bare, with entire hind border. Face very short, not prominent, bare, but concealed below the long hairs of the base of the antennae; genae and chin rather broad, haired. Antennae inserted near the mouth border, but at the level of the middle of the eyes, approximate at the base; first joint thickened, with a prominent tubercle below, bare above, densely clothed with a tuft of exceedingly long and soft hairs underneath; second joint small, short, globular; third joint small, once and a half as long as the two basal joints taken together, ovate at base, narrow and styliform for more than the terminal half, this narrowed part being provided with rather long hairs chiefly on the under side and ending with a thin but rather long style. Proboscis horizontal, longer than the head and thorax together; mouth-opening small, subquadrate; palpi rather short, with long hairs at end. Thorax short, subquadrate, with not very strong praesutural and supra-alar bristles; metapleural tuft long and dense, fan-shaped. Scutellum with bristly hairs only at the hind border; squamae less developed, briefly hairy on the border; mesophragma on the sides with a membranous tubercle as in *Systropus*. Abdomen very long, conical, acute at end, destitute of macrochaetae at the hind border of the segments; female genitalia with a yellow bladder above, and destitute seemingly of a terminal circle of spines. Legs stout and short; the hind femora only with a few spines below at apex; all the tibiae with numerous and long spicules and with numerous spurs at end; pulvilli well developed.

Wings very short and narrow, stalked at base, destitute of alula; first longitudinal vein straight, less looped at the end and not retreating; only two submarginal cells. Upper branch of the cubital fork straight, not at all retreating, running parallel with the border; discal cross-vein situated in the last third of the discoidal cell; four posterior cells, the 1st of which is closed and briefly stalked, the 2nd and 4th are broadened, the 3rd narrowed at end. Discoidal cell very narrow, with almost parallel sides, its terminal cross-vein being straight and only a little longer than the discal cross-vein; anal cell open but narrowed at end; ambient vein complete. The supernumerary vein in the anal cell placed in the concave fold just below the sixth vein, long and very distinct, extending almost to the end of the anal cell.

Type: *Eurycarenum pachyceratus*, Bigot, a species upon which, before seeing the co-types, I have made many wrong speculations; whence the name, from *oneiros*—dream.

#### ONIROMYIA PACHYCERATA, Bigot, ♀.

A peculiar species with thickly pilose head and thorax, at once distinguished from any other by its generic characters. Bigot has described it from the Cape in a recognisable manner, much better than usually with him, and has pointed out that it must be the type of a new genus. In the collection there is a female specimen from Namaqualand, O'Okiep, October, 1890 (R. M. Lightfoot). Length of the body 9.5–10 mm.; of a wing 6.8–7 mm. To Bigot's description may be added: Occiput grey-dusted, but the vertex and the frons are shining black; the tuft of white hairs at the under side of the first antennal joint is very long, and is fused with the tuft of the sides of the frons and of the base of the cheeks, forming a sort of moustache; proboscis black, 5 mm. long; palpi black, with pale yellowish hairs, all the thoracic macrochaetae are yellow; metapleural tuft pale yellowish; squamae dirty-yellowish, with sparse white hairs. Abdomen at end with long and rigid black hairs. Venter black, grey-dusted, densely clothed with white scaly tomentum with some long white hairs at base. The ground-colour of the tibiae and of the praetarsi of the 4 anterior legs is yellow; all the spines and spurs are yellow, but on the hind tibiae, partly black; hind femora with 3–4 short yellow spines below at the end on the outer side; claws pale yellowish red, with black tip; pulvilli dirty whitish. Wing-veins dark brown, pale reddish at base; costa very thin at base, with scarce pale yellowish scales.

SUBFAMILY USIINAE.

CORSOMYZA, Wiedemann (1820).

Of this peculiar genus, very characteristic of the South African Fauna, there are in the collection numerous specimens, representing all the known species, with the addition of some new ones. The special feature of the genus resides in the facial circular brush, which consists of a dense pubescence of short hairs clothing the anterior part of the frons and the whole face, which is surrounded by more rigid and often differently coloured hairs. From this dense brush are projecting on the upper side the antennae (the basal joints of which are often clothed by a tuft of hairs of different colour), and below the proboscis and the long palpi. A similar conformation of the face is to be found only in the North American genus *Pantarbes*, Osten Sacken, which, however, has a closed first posterior cell, and in the Australian genus *Lasioprosopa*, Macquart. But this last genus, as already stated by Schiner in the Novara work, is synonymous with *Corsomyza*, its type species, *Lasioprosopa bigotii*, being *Corsomyza nigripes*, as confirmed by a specimen in the collection labelled under this name by Bigot.

The species in the collection are much alike in habitus and in the colouring of the body fur; they probably mimic Hymenoptera, having a very great resemblance to certain species of *Osmia*. They can be distinguished as follows:

- 1 (14). Third antennal joint wholly black; anal cell closed and usually provided with a short stalk.
- 2 (3). First antennal joint elongate, as long as the half of the third, which is broad; base of the antennae pale-haired; face yellow, with the circular brush not margined with black; tibiae and tarsi red.  
*simplex*, Wied.
- 3 (2). First antennal joint short, always shorter than the half of the third.
- 4 (5). Hind tibiae densely feathered with very long black hairs; face yellow, the circular brush not margined with black hairs; antennae with the first joint pale-haired and the third joint broad.  
*pennipes*, Wied.
- 5 (4). Hind tibiae not densely feathered, sometimes only thinly ciliated.
- 6 (13). Facial brush formed by whitish or pale yellowish hairs.
- 7 (8). First antennal joint clothed on the upper side with black hairs, which form a striking black tuft within the brush; this last is surrounded with dense black hairs. Tibiae and tarsi black; third antennal joint narrow, but a little dilated at end. . . . *nigripes*, Wied.
- 8 (7). First antennal joint with yellowish or whitish hairs; third antennal joint filiform and much dilated at end.

- 9 (12). Abdomen as broad as or only a little narrower than the thorax, not, or less distinctly, conical; halteres with a white knob.
- 10 (11). Tibia and tarsi red; chin with a dense tuft of black hairs; femora dark-pilose; species of greater size . . . *hirtipes*, Macq.
- 11 (10). Tibiae and tarsi black; chin destitute of black hairs; femora white-pilose below; eye-division in the male less distinct than usually. *clavicornis*, Wied.
- 12 (9). Abdomen conical, only half as broad as the thorax; halteres with dark knob; tibiae and tarsi dark reddish-brown; sometimes there are three submarginal cells in the wing . . . *anceps*, Bezzi.
- 13 (6). Facial brush formed entirely by black hairs, with a yellow tuft on the base of the antennae; tibiae and tarsi black; third antennal joint thin at base and broadly clavate at end . . . *bicolor*, sp. nov.
- 14 (1). Third antennal joint rufous; anal cell narrowly open at the wing border, tibiae and tarsi yellow . . . *ruficornis*, sp. nov.

CORSOMYZA SIMPLEX, Wiedemann (1820).

A species of proportionately large size, distinct from any other by the elongation of the first antennal joint. Described and figured from the Cape by Wiedemann, and not recorded subsequently; but I am convinced that Macquart's *C. fuscipennis* from the Cape is the female of this same species, chiefly on account of the form of the antennae; the infuscation of the wings is in the male more yellow than fuscous. There is in the collection a male specimen from Cape Town, 1888 (W. F. Purcell), and another example from Namaqualand, 1889 (R. M. Lightfoot).

The pubescence of the body is of a pale fulvous colour, but shows white gleams when seen from the front. Occiput shining black, with a faint grey dust and with scarce and short pale yellowish hairs; the crest of white hairs on the vertex has a black tuft on each side; frons without dust, broad, almost twice as broad as the distance between the basal ocelli. The face and the cheeks are entirely of a pale yellow colour; the whitish circular brush is surrounded below by dark, but not black, hairs. Very characteristic are the antennae, as shown in Wiedemann's figure. The first joint has only whitish hairs. Beard white. Proboscis entirely black, 5 mm. long; palpi very long, as long as one third of the proboscis, with scarce and thin hairs.

The hairs of the pleurae are partly white and partly black; on the mesopleura there is a white vertical stripe, with a black one on each side; breast black-haired. Femora with dense black hairs below; the four anterior tibiae nearly bare; the hind tibiae with dark ciliae, but not properly feathered; last tarsal joint black; claws red with black point; pulvilli yellowish. The yellowish infuscation of the wings is



more intensive in the second basal cell, but not as strikingly as shown in Wiedemann's figure. The veins are intensely rufous, as in the other species of the genus.

*CORSOMYZA PENNIPES*, Wiedemann (1820).

Nearly allied to the preceding species, but distinct from it owing to the short first antennal joint and by the white- and yellow-haired pleura, and distinct from any other on account of the densely and long-feathered hind tibiae. Wiedemann has described the female from the Cape; there is in the collection a male from the Cape, without precise locality. *C. pennipes* of Macquart, "Suites à Buffon," is doubtful, because the author says that the femora (and not the tibiae) have long hairs.

Head exactly as in the preceding species; the first antennal joint is less than one-third of the third, and of a similar shape, which is very different from that of the species following. Eyes more broadly separated; the middle frontal furrow is even more distinct. Proboscis black, shorter, only 3.5 mm. long; palpi black, long, with much longer and dense, almost leathery hairs. Pleurae destitute of black hairs; on the upper border of the metapleurae there is a rich tuft of bright fulvous hairs, the other hairs being whitish; breast with pale hairs. Coxae with yellowish or whitish hairs; the feathering of the hind tibiae is formed by dense and numerous, very proximate black hairs, which on the upper side are longer and equally extended to the end, while on the under side they are shorter and growing shorter before the apex, which is bare; even the hind tarsi are feathered; no other species has such a conspicuous feathering of the hind legs.

Wings as in *C. simplex*, but clearer and with a very faint yellowish tinge at the base and along the fore border. The venation is identical.

*CORSOMYZA NIGRIPES*, Wiedemann (1820).

Allied to the two preceding species, but distinguished by the wholly black legs, by the black-haired first antennal joint, and by the facial brush being surrounded by black hairs.

Described from the Cape and subsequently recorded by Loew, Schiner, Ricardo and Becker; there are in the collection two males from Cape Town, one of which, caught in 1874, is labelled by Bigot "*Lasioprosopa bigotii* Macq."! The colour of the fur of the body in the present species varies from bright fulvous to pale yellowish and shining white. To Loew's good description may be added: Frontal furrow narrow but deep. The shape of the third antennal joint in the present

species is intermediate between the non-clavate form of *simplex* and *pennipes* and the very clavate form of the following species; it is well figured by Becker. Strongly characteristic of the species is the tuft of black hairs on the under side of the base of the antennae, which is very strikingly within the brush. The beard is blackish, while in the two preceding species it is white. Proboscis black, short, only 2.5–3 mm. long; palpi black, thin, with short black pile. The face is distinctly yellow on the under side below. Scutellum black. Claws red, with black point; pulvilli yellowish; hind tibiae with long and thin ciliae outwards, which are not continued on the praetarsus.

CORSOMYZA HIRTIPES, Macquart (1840).

Closely allied to *nigripes* and of equal size, but at once distinguished by the form of the third antennal joint, by lacking the black hairs at the base of the antennae and by the colour of the legs.

Macquart has described the female (?) from the Cape; in the collection there are two males and one female from Namaqualand, Port Nolloth (Cape), August, 1890 (R. M. Lightfoot).

Both sexes are coloured alike, the pubescence being of a paler colour than in most specimens of *nigripes*; the length is 8–9 mm., but one male measures only 6.5 mm. Occiput black, whitish-tomentose on the sides at the border of the eyes, with short and scarce pale hairs; at the vertex there is the usual transverse crest of erect hairs, which are of a pale yellowish colour, only in the male with some black hairs on the sides near the eyes. Frons shining black, with erect black hairs; only near the antennae is a circle of pale yellowish hairs; it is in the male as broad as twice the distance between the basal ocelli, and in the female it is more than twice as broad as in the male. Face entirely yellow in both sexes, black only in the hind part of the genae and on the chin; the brush is shaped as in *nigripes*, and is likewise surrounded with black hairs, which are less developed in the female, but beneath, at the base of the proboscis, there is a broad tuft of black hairs, triangular in shape, with the vertex directed forwards and the base merged in the black beard.

Antennae black, with the first joint short, densely clothed with long pale-yellowish hairs radiating all round, with some black hairs intermingled beneath, but not forming a distinct black tuft within the brush; third joint very long and thin, filiform, with the last fourth part abruptly dilated in an ovate club, which is truncate at end. Proboscis black, short, not more than 3 mm. in length; palpi thin and long, black, with scarce and short black hairs. Thorax and scutellum

entirely black; the hairs on the pleurae are whitish or pale yellowish, but in the male those of the lower part and of the breast are blackish. Halteres with white knob; squamae pale-yellowish, white fringed, like the plumula. Abdomen shining black, clothed with equal hairs, which are denser in the male, of a pale yellowish colour and shining white if looked at from the front; venter black, with short and scarce pale hairs. Femora black, with yellow tip, clothed below with dense and long hairs, partly whitish and partly dark, these last being sometimes predominant; tibiae and tarsi red, the hind tibiae being ciliated outwards, more densely in the male than in the female; last tarsal joint black; claws black with reddish base; pulvilli yellowish. Wings as in *nigripes*, but with a distinct milky-white tinge.

CORSOMYZA CLAVICORNIS, Wiedemann (1819).

Closely allied to *hirtipes*, but distinguished by the usually much smaller size and by the entirely black face and black legs. Described from a male from the Cape, and subsequently recorded from the same locality by Walker. There are in the collection a male from Dunbrody, Uitenhage (Cape), December, measuring 6 mm. of length, a female from Namaqualand, Port Nolloth (Cape), August, 1890, 6.5 mm. long (R. M. Lightfoot), and a doubtful female from the same locality, only 4 mm. long.

Head exactly as in *nigripes*, but the black outline of the facial brush is less developed and the first antennal joint has no black tuft beneath; beard pale yellowish; eyes with the division of the broader areolets less marked than in all the preceding species. Third antennal joint very characteristic, thin and filiform basally, much broadened apically on the last third or more, and with the broadened part incised beneath. Proboscis black, proportionally long, measuring about 3 mm.; palpi black, long, with a sparse black pile. Thorax, scutellum and abdomen as in *nigripes*, but the pleurae and breast with entirely whitish hairs. Halteres yellow, with a white knob; squamae and plumula with a white fringe. Legs entirely black, the femora with long and numerous white hairs below, which only on the front pair are more fuscous; hind tibiae shortly and scarcely ciliated outwards; claws black, pulvilli dirty-yellowish.

The female is very like the male, the frons being almost twice as broad. The broadened end of the third antennal joint is thinner and more regular; the fur of the body is coarser.

In a female specimen from Hottentots Holland Mountains, Caledon, C.C., 1916 (K. H. Barnard), the upper branch of the cubital

fork shows in both the wings, at the angular basal bend, a short stump of vein, which must be considered as the beginning of the cross-vein which divides the first submarginal cell into 2 cells, as is sometimes the case with *C. anceps*, Bezzi.

CORSOMYZA ANCEPS, Bezzi.

A smallish species, with bright fulvous pubescence and with clavate antennae, distinct by its narrow and conical abdomen, by the dark halteres, and by the reddish-brown tibiae and tarsi. I have described the male in my work on the Bombyliidae of the British Museum. That specimen bears on the wing 3 submarginal cells, making therefore the separation of the genus *Callynthrophora* on this character alone very doubtful. There is in the collection a very small female from Namaqualand, Port Nolloth (Cape), August, measuring only 4 mm. in length; it agrees with the male, with the following exceptions: The frons is more than twice as broad; the face is dark brownish, with a fulvous brush, which is not margined with black, but is entirely black below on the genae and on the chin. Wings exactly as in the male, but without any trace of the 3 submarginal cells.

CORSOMYZA BICOLOR, sp. nov., ♂.

A small species allied to the preceding one, but distinct from it and from any other on account of the wholly black facial brush, in the centre of which the radiating hairs of the base of the antennae form a striking yellow tuft.

Type ♂, a single specimen from O'Okiep, November, 1886 (L. Péringuey). The possibility is not excluded that the female described above as belonging to *anceps* may be that of the present species, notwithstanding the great difference in the colour of the facial brush.

Length of body 7.5 mm.; of a wing 6 mm.; of wing expanse 14 mm. Head entirely shining black; occiput with a faint grey tomentum at the sides on the eye borders and with scarce and short yellow hairs above in the middle; hairs of the vertical crest yellow in the middle and black on the sides; frons twice as broad as the distance between the basal ocelli, with a middle longitudinal depression and a basal transverse furrow; the frons is anteriorly broader than in the other species, the antennae being inserted lower down, thus approaching to the condition found in *Callynthrophora*; it is clothed with long, pale-yellow, erect hairs with some black ones forming a transverse band before the ocellar triangle; ocellar tuft pale yellow. Eyes with the upper

areolets only a little broader and not really distinctly separated from the others. Face with the brush formed by long and less dense black hairs, with a few yellow ones scattered in the middle; the genae and the chin are likewise clothed with black hairs. Antennae entirely black; the first joint short, provided with long and radiating bright yellow hairs; third joint with the basal half thin and filiform, the apical half broadened to form an ovate spatula acute at tip, instead of being obtuse as in *clavicornis*. Proboscis entirely black, 2.5 mm. long; palpi elongate, black, with rare black hairs. Hind part of thorax and scutellum black, clothed with long but not dense, bright fulvous hairs; only below the root of the wings there is a small tuft of fulvous hairs directed backwards. Halteres yellowish with whitish knob; squamae small, dirty yellowish, with whitish fringe, the plumule with yellow fringe. Abdomen black, densely clothed with bright fulvous equal hairs, even on the belly. The contrast of colour between the upper and lateral parts of the thorax and head is very striking. Legs black, the tibiae sometimes with dark yellowish brown ground-colour; coxae and underside of femora with long, rather rigid, black hairs; hind tibiae shortly ciliated outwards; claws black, pulvilli dark. Wings exactly as in *hirtipes*.

*CORSOMYZA RUFICORNIS*, sp. nov., ♂.

A small, rather aberrant species, easily distinguished from any other on account of its red third antennal joint.

Type ♂, a single damaged specimen from the Victoria Falls (S. Rhodesia), July, 1911 (L. Péringuey).

Length of the body 6 mm.; of a wing 5.5 mm. Head black; occiput grey-dusted with scarce and short whitish hairs above in the middle. The usual vertical crest seems to be reduced to the ocellar tuft which is entirely formed by whitish hairs; eyes with the upper areolets broader, the smaller ones being confined to the lower third, and being separated by a sharply defined line; frons a little broader than the ocellar triangle, clothed with long black hairs, turning to whitish before the antennae; facial brush formed by long whitish hairs surrounded by not well-defined dark ones; beard whitish. First antennal joint short, black, with whitish hairs; third joint red, with the basal half thin and filiform, and the apical half a little broadened to form a dark spatula bilobate at end. Proboscis broken off in the type example. Thorax, scutellum and abdomen black, clothed with long but not dense whitish hairs; pleurae, breast and belly likewise whitish haired. Halteres pale yellowish, their knob blackish above; squamae very small, with rare and pale hairs.

Femora black, with yellow tip, and provided below, like the coxae, with numerous white hairs; tibiae and tarsi entirely yellow to the end, the hind tibiae with a few white hairs; claws yellow, with black tip; pulvilli yellowish. Wings whitish hyaline, with yellow veins, distinctly more elongated than usually; the venation is typical, but the anal cell is narrowly open at the hind border.

CALLYNTHROPHORA, Schiner (1867).

I refer to this genus a new species, which is different from the typical ones in having only 2 submarginal cells. But I think that the essential character of the genus, as believed by its author, is not to be found in the number of the submarginal cells, which may be 3 even in a true *Corsonomyza* like *C. anceps*; we have here a case analogous to that of *Triplasius vittatus* and *Bombylius lateralis*, which are evidently congeneric notwithstanding the difference in the number of submarginal cells. From Schiner's description it is evident that the principal distinction is to be found in the shape of the head and antennae. The frons is in both sexes much broader than in *Corsonomyza*. Besides the antennae being inserted in a much lower position, the frons appears to be much longer than the face, and is inflated above the antennae, being consequently much broader. From this fact is derived the other—that is, the antennae are inserted exactly in the centre of the facial circular brush, and not on its upper border as in *Corsonomyza*. The frons declines gradually to the face, because a part of this last is becoming part of the first, as a result of the lower insertion of the antennae; therefore in the female the facial brush is not so well formed as in the male. The first joint of the antennae is shorter than in *Corsonomyza*, and distinctly swollen, being nearly of a spheroidal shape; the third joint is strongly clavate. All the other characters, as well as the general facies, are as in *Corsonomyza*. I have not seen the typical species, but only the following new one:

CALLYNTHROPHORA MARGINIFRONS, sp. nov., ♂, ♀.

A small species, distinguished from the typical one by the yellow colour of the face and of the fore-part of the frons and of the basal joints of the antennae, and the presence of only two submarginal cells in the wings.

Type ♂ and type ♀, a single couple of specimens from Namaqualand, Port Nolloth (Cape), August (R. M. Lightfoot).

Length of the body 6-6.5 mm.; of a wing 5-5.5 mm. Body perfectly conical, the head being broader than the thorax and the

abdomen being much narrower than the thorax. Head shining black, but the anterior half or even most of the frons and the whole face are of a pale yellow colour. Occiput with a faint pale dust on sides at the borders, and with short and scarce pale hairs; vertical crest formed by whitish hairs only. Ocellar tubercle very prominent, whitish-haired. Frons of the male a little broader than the ocellar tubercle, but becoming much broader in front, being inflated and measuring in front of the antennae more than four-sixths of the breadth of the head; the middle furrow is narrow but well developed, reaching the base of the antennae; the hairs are black on the part not clothed by the facial brush and whitish on the rest; the eyes have the areolets of the upper half a little broader but not sharply separated from the lower ones. Frons of the female gently rounded, inflated, three times as broad at the vertex as that of the male, measuring  $\frac{3}{4}$  of the breadth of the head; the division of the black from the yellow part is formed by a straight line placed nearly at half the distance between the vertex and the base of the antennae; the middle furrow is not distinct; it is clothed with black hairs on the black part and with whitish ones on the yellow part, but as the frons merges gradually into the face and into the cheeks, there is no distinct brush, the face being entirely yellow and very short. The face is clothed with entirely whitish hairs, like the cheeks and their sides, which are exceedingly broad and partly black haired. In the male the face is also yellow, but has a very well-developed circular brush, which is formed by white hairs and surrounded by black ones. Antennae with the first joint short and inflated, almost spheroidal, of a dark, reddish yellow colour, with long and scarce, rigid black hairs; second joint very small, perfectly globular, reddish yellow, black above; third joint entirely black, thin and filiform for more than the basal half, and subsequently dilated to an ovate spatule, which is narrowed at end. Mouth-opening proportionally small and narrow; proboscis very short, its end usually not projecting beyond the end of the antennae, and measuring only 1-1.5 mm. in length; palpi long, white-haired. Thorax, scutellum and abdomen black; in the male they are less shining, and entirely clothed with rather long but not dense, equal, pale yellowish hairs; in the female they are much more shining, with a very short, and on the abdomen very sparse, pale yellowish pubescence. Pleurae almost bare, with hairs on the mesopleura only, which are whitish in the female and partly black in the male. Halteres with a pale yellowish or whitish knob, which bears a black spot on the upper side in the male. Squamae whitish hyaline, with a yellow border and a very short pale fringe which is nearly wanting in the female. Legs

entirely black, in the male with dark hairs on the coxae and on the under side of the femora, with whitish ones in the female; hind tibiae scarcely ciliated on the outer side; claws black, with yellow base; pulvilli yellowish. Wings whitish hyaline, with yellow veins, and with the typical venation of *Corsomyza*, but the anal cell closed at the hind border itself or rarely very briefly stalked; the axillary lobe is also distinctly broader. There is no trace of the cross-vein forming the third submarginal cell in *Callynthrophora capensis*.

GNUMYIA, gen. nov.

I have to create here this new genus for a form which unites the characters of *Corsomyza* with those of *Callynthrophora*; the antennae and their position are more like those of the former, while the shape of head approximates more to that of the latter; there are, moreover, 3 submarginal cells on the wings; but it differs from both the genera in the linear third antennal joint, and from all the other genera of *Usiinae* in having a short proboscis, which is more like that of a Muscid than that of a Bombyliid; the facial brush (in the female) is indicated only by some denser lateral hairs. Head very broad and inflated, distinctly broader than the thorax. Occiput a little concave, not bilobate above; vertex rounded, distinctly lower than the eyes; there is no distinct occipital fringe. Ocelli disposed in equilateral triangle on a broad, rounded protuberance. Frons convex, very broadened forwardly and passing gradually to the very broad and convex cheeks and to the convex face; the breadth of the frons at the level of the antennae is three times as broad as that at the vertex, and that of middle of face is more than four times such. The face is separated from the cheeks by a deep furrow, which becomes deeper below and is directed towards the eyes; there the furrow makes a bend and is directed towards the mouth, separating thus the very broad but short cheeks. The face is densely pubescent, but the hairs are not disposed to form a distinct brush. Eyes bare, proportionally narrow, much narrower than high; in profile they are not broader than the prominence of the face and of the cheeks before them. Antennae inserted much above, near the level of the upper border of the eyes; they are broadly separated at base, the distance between them being as broad as that between the 2 basal ocelli; first joint rather swollen, but of an elongate cylindrical shape; second joint globular and setose; third joint very elongate, equal throughout its whole length, almost linear, more than twice as long as the two first joints together; it ends in a short, acute point, without a distinct style. The mouth-opening is proportionally small; the proboscis is



shorter than the mouth, rather incrassate, and ends with fleshy flaps; the palpi are very thin and are a little longer than the proboscis. Thorax and scutellum with long pubescence, but without distinct bristles; metapleurae bare; no distinct plumula; squamulae with a long but not dense, hairy fringe. Abdomen with long pubescence, and with distinct bristly hairs at the hind border of the segments. Legs simple; hind tibiae with long fringe outwardly. Wings of normal shape. First longitudinal vein very long; second vein straight, cubital fork broad, with the upper branch retreating at base and united with the second longitudinal vein by a cross-vein. Thus three submarginal cells are present: first posterior cell broadly open, broader at end than on middle or at base, about of the same breadth at end as the 2nd or the 3rd posterior cell; discoidal cell about twice as broad as long, obtuse outwardly, the middle cross-vein placed a little beyond its middle; anal cell closed and shortly stalked. Auxiliary lobe broad; alula short and rounded; ambient vein complete; costa densely but shortly pilose at base.

Type: the following new species.

*GNUMYIA BREVIROSTRIS*, sp. nov.

A black and black-haired species of middle size, with a dark-yellowish head and pale yellowish wings.

Type ♀ a single specimen from Hex River, January 10th, 1882 (L. Péringuey).

♀. Length of the body 8 mm.; of the wing 7 mm.; of the wing-spread 16 mm. Head rather shining; the whole occiput is black and bare, being provided with a rather long, black pubescence only below; the vertex is occupied by the broad and flat ocellar protuberance, which is entirely black and clothed with long, black, erect hairs. Frons yellowish, but on each side it shows an elongate black spot, which is in contact with the eyes inwardly and is rounded outwardly; besides there is a lanceolate small black spot in the middle, with the base in contact with the ocellar spot near the front ocellus; the frons is very shortly pubescent in the middle, and has on the sides black hairs which are denser near the cheeks. Face and cheeks entirely yellow, quite unspotted; they are equally clothed with black hairs, which are shorter on the face and denser and longer near the eyes; the cheeks are yellow anteriorly, but they are merging posteriorly into the black lower part of the occiput. Antennae with the first joint yellow like the frons; 2nd joint more brownish; 3rd joint entirely black; basal hairs of the antennae black. Palpi and proboscis dirty blackish,

with short and pale pubescence. Thorax and scutellum shining black, but the humeri more narrowly so, the postalar cell broadly and the posterior border of sternopleura with part of the pteropleurae, reddish brown; they are entirely clothed with black, long hairs; the hairs below the notopleural line at the upper border of meso- and pteropleura are longer, denser, and tuft-like. Squamulae dirty whitish, with a dark border and a pale fringe; halteres dark yellowish, with white knob. Abdomen entirely shiny black, even on the venter; its long hairs are entirely black, like the long and thin bristles. Legs entirely black and black-haired, but the tibiae somewhat reddish-brown and the knees narrowly yellowish. Wings with all the veins pale yellowish and with the membrane whitish-hyaline, with a faint yellowish tinge, chiefly at base and along the fore border; at hind border they are more iridescent.

#### HYPERUSIA, Bezzi.

This genus was founded by me for a robust species of proportionally greater size, from Natal, in the British Museum. The species here described as new is much smaller than the type-species, but agrees with it in the low position of the antennae and in the venation, although the anal cell is open.

#### HYPERUSIA MINOR, sp. nov.

A small, but robust, black species, resembling the female of the European *Usia versicolor*, and very distinct on account of its yellow antennae.

Type ♂; a single specimen from Zululand (M'Fongosi), April, 1916 (W. E. Jones).

♂. Length of the body 4 mm.; of the wing 3.5 mm. Head entirely shiny black, clothed at vertex, on frons and at sides of face with rather abundant greyish or pale hairs. The frons is not at all prominent; it is flat, or even concave on the fore half, and is very broad, broadening even more forwards, being at level of antennae nearly as broad as long. The face is very short, and is distinctly reddish-yellow on sides of the middle; the mouth border is prominent, and there is a furrow between the face and the cheeks and jaws. The antennae are inserted very near the mouth border, the mouth-opening being much produced above; but in profile they are always placed near the middle of the eyes; the two basal joints are short and black, but the first is about twice as long as the very short second joint, and is clothed on the under side with rather long, whitish hairs;

the third joint is twice as long as the two first joints together, elongate, oval, obtuse at end and without style; it is yellowish, but is blackened on the apical third. Proboscis very stout, broad at base, quadrate in section, straight and directed forwards, 1.5 mm. long; it is entirely shining black. Palpi about as long as  $\frac{1}{3}$  of the proboscis, thin, acute, black, with rather long greyish hairs, and with scattered golden-yellow, scaly hairs below them; the pleurae are almost bare, but with a tuft of long and dense whitish hair on upper part of the mesopleurae. Scutellum like the thorax, and destitute of bristles at hind border; squamulae whitish, with a scanty whitish fringe; halteres with whitish knob and yellowish stalk. Abdomen elongate, attenuated behind; it is shiny black, with scattered golden dust like the thorax, but almost devoid of hairs; only on the sides are some greyish ones; spines of the ovipositor reddish; venter black, but not shining, and without golden dust. Legs rather short, with coxae and femora black, tibiae and tarsi yellow; last tarsal joint blackish; they have no bristles, but only a scarce, pale pubescence; hind tibiae on outer side with a long but scanty fringe of hairs. Wings proportionately short, whitish-hyaline, immaculate, with entire pale yellowish veins. Their venation is as in *Cersomyia*; 2nd vein gently curved and broadly S-shaped; upper branch of cubital fork not retreating at base; middle cross-vein placed on the last third of the discoidal cell. First posterior cell broadened at end, but distinctly more narrow than the 2nd; the 3rd posterior cell is the narrowest of all, and the 4th is the broadest of all; anal cell rather broadly open. Ambient vein complete; axillary lobe broad, but the alula very short. Costa bare at base.

#### MEGAPALPUS, Macquart (1834).

I am attempting here to revive this genus, which was united by Schiner to *Corsomya* ('Novara. Dipt.', pp. 114 and 139). The likeness to this last genus is very great: the general shape of the body and head is the same; the structure of antennae is very like; the elongation of palpi also, and even the shape and pubescence of the legs. The wings have the same shape and neuration; only the anal cell is typically broadly open, or sometimes exceptionally closed at the wing border itself. The differences are to be found in the much greater nakedness of the body; in the absolute want of the circular facial brush; in the narrow genae; in the prominent hem at the mouth border and in the longer proboscis. In the male the eyes have equally small areolets and are much more broadly separated, the frons being

only a little narrower than that of the female. Halteres and wing veins black.

Notwithstanding Schiner's contrary opinion, *Phthiria capensis*, Wied., belongs to this genus, and may be considered the type of the gen. *Megapalpus*, as stated by Macquart himself in the "*Suites à Buffon*"; the new gen. *Dasypalpus* founded by the same author in 1840 is based on the difference in the hairiness of the palpi—a difference which does really not exist.

MEGAPALPUS NITIDUS, Macquart (1840).

A small black species, distinct from all the species of *Corsomyza* aforementioned on account of the sparse hairiness of the body, and of the black halteres and black veins of the wings.

This species strongly recalls the female of the Mediterranean *Usia versicolor*, Fabr; but has a very different head, antennae and wings.

A couple of specimens from Namaqualand, Port Nolloth (Cape), August, 1890 (R. M. Lightfoot).

Length of the body 3·5–4 mm.; of a wing 3–3·5 mm. Head broader than the thorax, entirely shining black; occiput flat, with very short and scarce black hairs; frons almost equally broad in both sexes, flattened, with parallel sides, and having a less distinct median longitudinal furrow, equally clothed with rather long erect black hairs. Ocellar tubercle less prominent; ocelli well developed. Face short, with a prominent hem at the mouth border, clothed like the narrow genae with black hairs; beard white. Antennae entirely black, rather separated at the base; they are as described by Macquart, and seem to be carried in a peculiar way, the third joint being erect and produced almost at right angles to the first joint; this last joint is clothed with black hairs, which are longer below and in the female are partly of pale colour. Proboscis entirely black, almost as long as the body, measuring 3–4 mm. in length; palpi black, very long, with short but distinct black hairs (Macquart says that the palpi are yellow and bare). Thorax, scutellum and abdomen entirely black, rather shining, with distinct bluish glance in the male; they are clothed with scattered, erect, black hairs, rather long in the male and shorter in the female; only on the notopleural line and on the hind border of mesopleura are tufts of short, yellowish hairs; on the sides of the thorax and on the hind border of the scutellum are rather distinct and longer bristly hairs. First joint of abdomen with white pubescence in both sexes, the sides of the other segments with pale short pubescence in the female. Halteres with yellowish stalk and black knob. Squamae

white, without distinct fringe. Genitalia of the male shiny bluish black, retracted; those of the female with two broad lamellae. Legs entirely black, the femora with rare, pale and dark hairs below; hind tibiae with 4-5 long ciliae outwardly in the basal half; middle tibiae with two ciliae; claws minute, black with yellow base; pulvilli dirty yellowish. Wings hyaline, with black veins; venation as in *Corsomyza*, but the anal cell in the male is closed at the border, in the female it is narrowly open.

MEGAPALPUS FULVICEPS, sp. nov.

A very strange and robust insect, which was named by Bigot "*Amictus fulviceps*," and which may be provisionally placed in the present genus.

Type ♀, a specimen from the Cape, Van Rhynsdorp (R. M. Light-foot), Namaqualand, Port Nolloth.

♀. Length of the body 9 mm.; breadth of the body 5 mm.; length of the wing, 8.5 mm.; wing spread 22 mm. Head very developed, and distinctly broader than the thorax. Occiput concave above, shiny black, but with a broad yellow spot extending from the neck to the upper corner of the eyes; it is clothed with short white hairs, which become longer and denser on the sides and below, merging into the dense white beard of the chin. Frons twice as broad as the eye, shiny black, but with a yellow curved band on the fore part above the antennae, in contact with the yellow face; from the ocellar tubercle two abbreviate black stripes start hindwards, reaching the yellow occipital patch. The frons has only scarce and short fuscous hairs, which are more whitish and longer on the vertical edge; above the root of the antennae there is in the middle of frons a circular depression. Eyes rather narrow in profile. Antennae inserted at the level of the upper corner of the eyes, very long (measuring 4.5 mm. in length) and horizontally porrect; they are entirely black. The first joint is cylindrical, only a little shorter than the third, with very scarce and short pale hairs; second joint very short and lenticular; third joint compressed, of an elongate oval shape, broader in the middle than at the end, obtuse at end. Face very broad and entirely yellow, shining, with only a small black, transverse spot near the root of the antennae; the mantle border is prominent in the shape of a conical protuberance separated from the broad cheeks and jaws by a deep furrow; the entire face is bare, with only a very short and thin, pale pubescence. Palpi long and thin, black, shortly pubescent; proboscis 5 mm. long, horizontal, stout, entirely black, bearing near

the base into the oral cavity long white hairs. Thorax very stout, broad and short, quadrate, shining black, finely punctate; on the back it is clothed with a very short white pubescence, which on the sides is longer and forms a narrow white border. The pleurae are clothed with longer white hairs, which form very rich tufts on the notopleural line and on the mesopleurae; metapleurae bare. Scutellum like the thorax and likewise clothed with a short and obtuse, white pubescence; mesophragma concealed. Squamulae white, with a narrow yellowish border and a short white fringe; halteres white. Abdomen broader than the thorax, broader than long, shining black, finely punctate, clothed with short, whitish pubescence, which is denser on the 2 last segments; first and second segment on the sides with rather long white hairs; venter shining black. Legs short and stout; coxae black, with whitish pubescence; femora shining black, reddish-yellow above and at end; middle femora with a row of long black hairs on front side; tibiae and tarsi reddish, with yellowish spicules, but partly black on the middle pair; last tarsal joint deep black; claws black, with red base; pulvilli dirty yellowish. Wings broad and short, suffused with a faint yellowish tint, more intensive at base and at fore border, and fainter at the apex, which is hyaline; veins entirely reddish. Costal cell long and dilated outwardly; middle cross-vein placed near the tip of the discoidal cell; 1st, 2nd and 3rd posterior cell of about the same breadth at end, the vein between the 1st and the 2nd rather wavy; anal cell closed and shortly stalked. The venation is typical as in *Corsomyza*.

## SUBFAMILY PHTHIRIINAE.

### GONARTHURUS, Bezzi.

This new genus was recently founded by me for my *Dischistus cylindricus*; I include here two species described by Bigot and two new ones. The present genus is very distinct owing to its narrow and elongate, cylindrical body, devoid of strong bristles; the moustache is dense and soft; the occipital hairs are long and form a very dense crown. The eyes of the male are coalesced for a considerable distance and have the upper areolets enlarged; the frons of the female is rather narrow. The antennae are long, with the third joint linear and provided with a very thin terminal style; the proboscis is rather short, and sometimes exceedingly short and thick; the palps are long, two-jointed, with the apical joint produced outwardly and thus at

right angles with the basal one; the metapleura is bare; the legs have bristly hind femora, bristly tibiae and long pulvilli; the wings are short, destitute of a basal hook, comb, and alula. The first vein is straight and the marginal cell not dilated at end; discal cross-vein placed on the last third of the discoidal cell; first posterior cell broadly open.

In the collection are three species, to which I can add another from my own collection; they may be distinguished as follows:

- 1 (6). Proboscis very short and thick, shorter than the thorax, with broad terminal labella.
- 2 (5). Body clothed with moderately long hairs, which are of a yellow colour; halteres of male white; tibiae black.
- 3 (4). Species of larger size, at least 10 mm. long; pubescence of a paler yellow colour; ocellar tuft in both sexes and first antennal joint in the male with black hairs above; female with black hairs on the vertex.  
*leucophys*, Bigot.
- 4 (3). Species of smaller size, not over 8 mm. in length; pubescence of bright yellow colour; ocellar tuft and first antennal joint in both sexes yellow-haired; female without black hairs on vertex.  
*xanthinus*, sp. nov.
- 5 (2). Body clothed with exceedingly long and white hairs; halteres of the male with black knob; tibiae sometimes yellow. *cycnus*, Bigot.
- 6 (1). Proboscis thin, longer than thorax and head, with narrow terminal labella; basal joint of antennae black-haired above.  
*chioneus*, sp. nov.

#### GONARTHUS LEUCOPHYS, Bigot (1892).

A species distinguished by the short and thick proboscis, the black hairs on the ocellar tubercle and on the base of the antennae in the male, the yellow pubescence and the straight, not retreating base of the upper branch of the cubital fork.

Originally described from the Cape; there is a male from Barberton, Transvaal, April, 1911 (H. Edwards).

In the present species the third antennal joint is very narrow and acute, being much narrower than the first. The hind femora have more numerous spines, 3-4 in number; the middle femora have 2 spines.

#### GONARTHUS XANTHINUS, sp. nov., ♂, ♀.

Very near the preceding, but at once distinguished by the smaller size, the yellow ocellar tuft, the wholly yellow-haired base of the antennae and the bright yellow colour of the pubescence of the body.

A male specimen from Kimberley (Cape) March 14th, 1912 (J. H. Power), and a female from Potchefstroom (Transvaal) (T. Ayres).

Length of body 7–8 mm. ; of wing 6–7 mm. Occipital border with very long yellow hairs which form a complete crown ; ocellar tuft yellow in both sexes, but in the male a little darker. Face very short, with entirely yellow hairs, continued over the very narrow cheeks ; beard short, yellow ; eyes of male intimately connected ; frons of the female less broad than the eye, clothed with dense golden yellow tomentum and with erect yellow hairs ; the hairs of the cheeks in the female are white. Antennae entirely black, the first joint with yellow hairs, those of the upper side very short, those of the under side very long ; third joint longer than the first two joints taken together, linear, obtuse at end, not narrower than the second at base, with a very minute style. Proboscis black, 2 mm. long ; palpi black, pale-haired. Thorax and scutellum wholly deep black, clothed with equal, dense and rather long yellow hairs, those on the back being pale shining if viewed from the front ; the hairs on the pleurae are less pale ; metapleura bare, but concealed below the mesopleural and squamal tufts ; there are no distinct bristles. Squamae dirty-whitish, with long yellow fringe ; halteres yellow, with a white knob. Abdomen of conical shape, entirely black, clothed with hairs like those of the thorax, which on the venter are shorter and rarer ; male without, female with distinct and long, black, bristly hairs at the hind borders of the segments ; male genitalia black, yellow-haired ; female genitalia with broad black lamellae, the upper one rather shining and golden-fringed at apex. Legs black, with yellowish scales, whitish hairs and black spines on femora ; middle femora with 1, hind femora with 2–3 spines on the apical half. Wings entirely hyaline, narrowly yellowish near the base ; veins yellow, darkened at end ; upper branch of the third vein a little retreating at base.

GONARTHURUS CYCNUS, Bigot (1892).

Allied to the preceding, but distinguished by the very long, white pubescence of the entire body and by the black knob of the halteres in the male sex.

The present species was briefly, but recognisably, described from the Cape. There are in the Museum Collection numerous specimens of both sexes from Stellenbosch (Cape) (L. Péringuey), Potchefstroom (Transvaal) (T. Ayres), Namaqualand, O'Okiep (Cape), October, 1890 (R. M. Lightfoot). One of these examples was labelled by Bigot as *Bombylius niveus*, Macquart—an impossible thing, however,



because in Macquart's species the discal cross-vein is situated near the base of the discoidal cell.

The length varies between 7 and 11 mm., but usually it is 8-9 mm. The third antennal joint is very broad in the male, and less distinctly so in the female; the hairs of the first antennal joint are very dense and long underneath; the ocellar tuft is black in the male and dark yellow in the female; the frons of the female is very narrow, even narrower than the eye, and on each side of the vertex there is sometimes a tuft of long yellowish hairs, but no black hairs at all. The proboscis is black, very short and exceedingly thick, with broad terminal labella. Thorax, scutellum, and abdomen entirely deep black, clothed with very long and shining whitish hairs, without bristles, even on the hind borders of the abdominal segments of the female; in this sex there is a short and dense tomentum of more yellowish colour under the long pubescence. The knob of the halteres is entirely yellow in the female, and is white with a black band above in the male. Venter with short and scarce hairs, but concealed under the very long and dense hairs of the lower sides of the tergites. Legs with dense white scales, long white hairs and black bristles; middle femora with 1-2, hind femora in the male with 2-3, and with 5-7 spines in the female; they are black, but the tibiae and the tarsi at base are often of a yellowish ground-colour below the scales. Wings very short, entirely vitreous and iridescent, with a tuft of silvery hairs near the base on the outer side; veins black, yellowish toward the base; upper branch of the cubital fork a little retreating at the base.

*GONARTHUS CHIONEUS*, sp. nov., ♂.

Closely allied to the preceding species, but distinct owing to the long and thin proboscis and to the basal joint of the antennae being black-haired above.

Two males in the writer's collection, from Willowmore (Cape), February, 1907 (Dr. Brauns).

Length of body 7.5-9.5 mm.; of a wing 5.5-7.5 mm. Occipital crown formed by very long, white hairs, which appear to be fairly yellowish near the base; ocellar tuft black, rather short; frontal triangle very small and deep. Antennae black, with the first joint rather black, and provided with short black hairs above and with long ones partly yellowish, partly white below; third joint longer than the two first together, linear, obtuse, as broad at the base as the second joint, with a minute terminal style. Face very short, almost bare, concealed below the long antennal hairs; the mystax is confined to the

small cheeks, which are clothed by dense hairs, dark yellowish above and white below, the latter being the more developed; beard white. Proboscis entirely black, thin, with small terminal labella, 3-4.5 mm. long; palpi black, long, the apical joint with short white hairs. Eyes intimately connected. Thorax, scutellum and abdomen deep black, the last a little shining, chiefly at the base of the segments; they are entirely clothed with dense, soft, equal, rather long white hairs which from a front view have a silky sheen, without any dark bristles, even on the abdomen; the hairs of the end of the abdomen are narrowly yellowish at the base; venter with long hairs, but it is concealed under the long hairs of the sides of the tergites. Genitalia black. Squamae white, with yellow border and long white fringe; pleurae densely clothed with grey-dust. The black band of the knob of the halteres is limited to the upper side. Legs entirely black, white-scaled, with the femora white-haired and black-spinose; middle femora with 2, hind femora with 4-6 spines; claws black, with a reddish base; pulvilli dirty yellow. Wings hyaline, iridescent, a little whitish on the basal half and along the fore border, with yellow veins; base of the costa with a short tuft of silvery hairs; upper branch of the cubital fork a little retreating at base.

GONARTHURUS CYLINDRICUS, Bezzi (1906).

Easily distinguished from *chioneus*, Bezzi, on account of the black abdominal bristles and of the white knob of the halteres.

Of this widely spread species there is a female specimen from South Rhodesia, Gwelo, April, 1917 (Miss Skaife).

CROCIDIUM, Loew (1860).

This genus is not represented in the collection, but I have received a specimen of the typical species from Willowmore (Cape), and have seen a new species with unspotted wings from the same locality. Its nearest ally is *Gonarthurus*, which, however, differs in the venation being that of a *Dischistus* with a broad cubital fork and an open anal cell.

To Loew's description of the genus may be added: Occiput flat, not inflated, briefly haired along the border. Ocelli disposed in an equilateral triangle. Eyes of the male united for a long distance, with the upper areolets enlarged and sharply separated from the smaller ones. Antennae inserted at the centre between the eyes, approximate at the base, with the third joint twice as long as the first. Face of the male with long moustache. Thorax, scutellum and abdomen without distinct

bristles. Legs without spines on femora, but with minute spicules on tibiae; pulvilli long. Squamae briefly fringed. Wings with a broad and prominent axillary lobe; alula of median size, rounded.

*CROCIDIUM POECILOPTERUM*, Loew (1860).

Dipt.-Faun. Sudafrikas, p. 195, pl. 11, f. 8.

A curious fly intermediate between *Dischistus* and *Phthiria*, and at once recognisable on account of the peculiar wing pattern.

A male specimen in my collection, from the Cape, Willowmore, January 15th, 1907 (Dr. Brauns). Another male from Ceres (Cape), Matroosberg, 3500 ft. (R. M. Lightfoot), distinguished on account of its peculiarly spotted wings.

The male, hitherto not described, is very like the female. The eyes are united in a line as long as the frontal triangle; their enlarged upper facets occupy two thirds of the eye and are of a reddish brown colour, while the lower small faceted part is lighter; the line of division between them is a very conspicuous one. The facial hairs are longer than the 2 basal antennal joints. Frontal triangle white-dusted, as broad as the ocellar one. Pubescence of body and legs distinctly longer than in the female. Genitalia spheroidal, bilobate, greatly developed, grey-tomentose and white-haired.

*CROCIDIUM NIGRIFACIES*, sp. nov.

Closely allied to *immaculatus*, Bezzi, on account of its unspotted wings, but at once distinguishable by the completely shiny black, more convex face, and by the black tibiae.

Type ♂, a single specimen from Bulawayo, September, 1911 (H. C. Peard).

♂. Length of the body 5.5 mm.; of the wing 5.5 mm.; of the proboscis 2.5 mm. Head black, but clothed with dense grey dust on frontal triangle and on cheeks, only the rounded and prominent lower part of face being shining black. Occipital border with greyish hairs; cheeks and lower part of occiput with long and soft white hairs. Ocellar tubercle prominent, with erect whitish hairs; eyes rounded, of great size, touching for a space a little longer than the ocellar triangle. Antennae entirely black; first joint about three times as long as the very short second joint; third joint as long as the two first joints together, narrow, elongate-oval, with a distinct terminal style. Proboscis black, gently curved downwards; palpi long and thin, acute, pilose at the under side. Thorax entirely black, opaque, but clothed

with dense grey dust; on the back are 4 blackish, longitudinal, dull stripes, 2 of which on the middle more narrow, approximate and abbreviate behind, and 2 broader and abbreviate in front, one on each side. The hairs on back and pleurae are long, soft, whitish. Scutellum like the back, with no distinct bristles. Squamulae whitish-pellucid, with white marginal hairs; halteres yellowish, with the knob infuscated above. Abdomen like the thorax and likewise clothed with long whitish hairs, devoid of bristles; genitalia black, grey dusted. Legs quite black, the knees only being narrowly yellow; fore femora with long white hairs; hind tibiae with short, but distinct black spicules. Wings whitish hyaline, quite unspotted, only the subcostal cell and the stigma being dark yellowish; veins yellowish on the basal half, black on the rest; cubital fork narrow and elongate, with the upper branch gently curved at base and originating at an acute angle; middle cross-vein placed beyond the middle of the obtuse discoidal cell, with a faint greyish shading in the middle; first posterior cell broadly open, only a little narrower than the 2nd following ones, which are of equal width at end; anal cell closed and shortly stalked.

PSEUDEMPIS, gen. nov.

Allied to *Apatomyza*; and in the same way that this last genus recalls a *Therevid*, thus the present one strongly resembles an *Empis*, hence the name. It is founded on *Amictus heteropterus* of Wiedemann, a species which is very different from *Thlipsomyza heteroptera* of Macquart, which is now placed in *Amictus*; on this last species Rondani in 1863 has founded its genus *Thlypsogaster*, which has nothing to do with *Amictus heteropterus*, Wied., or as mistaken by Williston in *Psyche*, 1899.

The characters of the new genus are as follows: Head rounded, small, narrower than the thorax; occiput developed, inflated, without fringe at the eye's border. Ocelli of greater size, placed on a rounded prominent tubercle and disposed in an equilateral triangle. Eyes bare, not indented behind, comparatively small, with equally small areolets in both sexes; in the male they are separated, but the frons between them is narrower than the ocellar tubercle; in the female the frons is broadening, measuring at vertex one-fifth, and before the antennae one-third, of the breadth of head. Face short, perpendicular, not prominent, bare. Antennae inserted above the middle of the eyes, and horizontally correct; first joint long, rather thickened, haired; third joint much smaller, linear, as long as or a little shorter than the first two joints together, acute at end, with a thick terminal style.

Mouth opening rather small, horizontal or nearly so; proboscis twice as long as the head; palpi very long and thin, pointed, briefly pilose. Thorax and scutellum without bristles, with only a few thin bristly hairs; pleurae almost bare; no metapleural tuft. Squamae small, with short and thin marginal hairs. Abdomen elongate, conical, with bristles at the hind border of the segments; male genitalia exerted, appendiculate below; female genitalia very peculiar. Legs long, almost bare, without spines or spicules; tarsi distinctly thickened; pulvilli and claws well developed. Wings long and broad; second longitudinal vein straight; cubital fork long and narrow; discal cross-vein placed after the middle of the discoidal cell; only three posterior cells present, the first being broadened at end, anal cell closed and provided with a rather long stalk. Ambient vein complete; axillary lobe broad; alula small, rounded, ciliated. The stumps of veins on the outer border of the discoidal cell, figured by both Wiedemann and Macquart, are the rudiment of the vein dividing the second from the third posterior cell—a vein which in the present species is wanting, the two cells being fused into one.

The new genus *Pseudempis* is based on the same type-species on which Bigot has founded his undescribed genus *Pseudoamictus*. I think that the *Amictus heteropterus* of Wiedemann is very different from that interpreted by Macquart and accepted by me; this last one has only 3, while the former has 4 posterior cells. Bigot's species is evidently the same as that of Macquart.

Type: *Pseudempis heteroptera*.

#### PSEUDEMPIS HETEROPTERA, Wiedemann (1821).

An elongate species, with wholly infuscated wings, strongly recalling the European *Empis tessellata*.

Originally described from the Cape, there is in the collection a single couple—the male from Cape Town (L. Péringuey) and the female from Namaqualand, O'Okiep (Cape), September, 1890 (R. M. Lightfoot).

Length of body 10–10·5 mm.; of a wing 11·5–12 mm.; of the wing expanse 24–26 mm. To Wiedemann's description may be added: The hairs of the first antennal joint are of a very dark-yellowish colour, or even blackish, chiefly in the male; the moustache is reduced to a tuft of hairs on each side, placed on the lower part of the cheeks, yellow in the male and white in the female like the beard and the hairs of the lower part of the occiput. The antennae are black, but the first joint is grey-dusted; proboscis black, 3 mm.

long; palpi black, with yellowish hairs. The thoracic pattern is very striking; the hairs and the pubescence are in the male yellower and longer, in the female whiter; but on the sides, on the posterior half and on the scutellum there are some scattered blackish hairs. Squamae dirty yellowish, with pale hairs; halteres yellow, with the knob black-spotted below. Tomentum of the abdomen golden-yellow in the male and yellowish-grey in the female; the venter is grey, with paler hind borders of the segments. Male genitalia yellowish-red, the inferior appendices bearing in the inner part a strong black hook; female genitalia yellowish, the last abdominal segment being open and bearing below a horn-like process; the ovipositor is tubular, with the basal joint much greater. Legs with the coxae blackish-grey, with yellow end; in the female the front femora are in the greater part black with yellow end, and yellow on the inner side; the femora are whitish tomentose, and have very scarce and short whitish hairs below; the greater part of the tarsi is black, chiefly in the female, in which they are much thickened; claws black; pulvilli dark. Wings with black veins.

### PTHIRIA, Meig.

Illiger's Mag. f. Ins., ii, p. 44, 1803.

This genus is represented in South Africa by some characteristic species, three of which are represented in the collection.

The species may be distinguished as follows:

- |   |      |   |                            |
|---|------|---|----------------------------|
| 1 | (2). | Body black and yellow; legs entirely reddish . . . . .  | <i>laeta</i> , sp. nov.    |
| 2 | (1). | Body and legs entirely black.   |                            |
| 3 | (4). | Third antennal joint rather short and less gibbous, pubescence of the body short; wings greyish hyaline . . . . . | <i>pubescens</i> , Bezz.   |
| 4 | (3). | Third antennal joint longer and very gibbous above; pubescence long; wings whitish hyaline . . . . .              | <i>lanigera</i> , sp. nov. |

### PTHIRIA LAETA, sp. nov.

A yellow and black species near *Phthiria nitens*, Bezzi, from Abyssinia, but distinguished by the quite opaque abdomen, and by the different thoracic and abdominal patterns.

Type ♀ from the Transvaal, Florida, December, 1918 (R. W. E. Tucker).

♀. Length of body 5 mm.; of proboscis 2.5 mm.; of wing 5 mm. Head reddish, quite opaque; occiput broadly black in the middle;

frons with a longitudinal, black, median stripe, which is angularly dilated in front of the ocelli and forms a transverse band above the root of the antennae.

Antennae quite black, with the third long joint, about linear, ciliated above, with very short terminal style at its upper angle; peristome and chin yellowish, with long and soft white hairs. Palps and proboscis quite black. Thorax blackish and opaque on the back, with a fine dark grey tomentum and with whitish hairs; the humeri, a narrow stripe above the notopleural line, a broader stripe above the root of the wings and the postalar calluses yellow. The pleurae are yellow and opaque, with black spots on the mesopleura and on the breast; the hairs are long and whitish. Scutellum yellow, with a very narrow basal black stripe, and with a broader black apical border, which is, however, not visible from above. Post-scutellum and mesophragm black; halteres and squamulae whitish.

Abdomen rather swollen and convex, quite opaque, clothed with whitish hairs; each segment is of a deep black colour, with a proportionally broad, equal and complete yellow stripe at the hind border; the second segment has the black part twice as broad as that of the following segments; venter with the black and yellow parts of about the same width, and with whitish hairs. Legs reddish, with pale yellow coxae, infuscated tibiae, and blackish tarsi; anterior femora with a black longitudinal stripe on the outer side; trochanters blackish; hairs whitish. Wings greyish hyaline, with yellowish stigmae; veins black, with yellowish base; discal cross-vein placed at about the middle of the discoidal cell; cubital fork about three times as long as broad at end; anal cell briefly stalked.

*PHTHIRIA LANIGERA*, sp. nov.

A small, entirely dull black species with whitish wings, entirely clothed with very long, soft and dense whitish hairs.

Type ♂, from Cape Town (K. H. Barnard); ♀ (rubbed) from Hottentots Holland Mtns., 4000 ft., Cape.

♂. Length of the body 4.5 mm.; of the wing 4.5 mm. Occiput, frons and face clothed everywhere with long, whitish hairs. Eyes touching for a length a little longer than the black, prominent ocellar triangle which bears only scarce and darkish hairs. The frons above the antennae is not triangular but transverse, very broad laterally, merging gradually into the cheeks; it is very prominent in profile like the cheeks; genae very narrow, linear. Antennae entirely black; first joint twice as long as the second, with white hairs, while the latter is clothed above with short, dark hairs; third joint more elongate than in

the allied species, being  $1\frac{1}{2}$  times as long as the two first joints together; it is very gibbose at its upper border and shows there 2-3 bristly hairs; at the end it is almost bifurcated, having above a thick and proportionally long style, and below a point with a tuft of hairs. Proboscis thin, black, gently curved downwards, 2.2 mm. long; palpi very thin and long, black, with scattered short hairs below. Thorax and scutellum deep black, dull, everywhere clothed with long, soft, white hairs, without distinct bristles; the pleurae are hairy only on meso- and pteropleurae. Squamulae quite white, with scarce and short marginal hairs of the same colour; halteres pale yellowish. Abdomen of conical shape, coloured and clothed like the thorax; venter more grey dusted; genitalia with the lamellae reddish at the hind border. Legs entirely black, with yellowish knees; the 4 front tibiae are clothed with a dense, scaly, greyish dust; all the femora with long whitish hairs; only the middle tibiae with some very short spicules at the hind side. Wings whitish hyaline, with yellowish stigma; veins black, with yellowish base. Second longitudinal vein straight; cubital fork proportionally short and widely open at end; middle cross-vein placed near the last third of the discoidal cell, which is of greater size and broadly obtuse at end; first posterior cell broadly open, broader than the 3rd, but less broad than the 2nd; terminal stalk of anal cell rather long.

The female is like the male; the broad frons is black, convex and somewhat shiny above the antennae.

#### PHTHIRIA PUBESCENS, Bezzi.

Closely allied to the preceding species, but distinct by the shorter and yellowish pubescence, by the shorter and less gibbose third antennal joint which has a much shorter and thin terminal style; besides, the wings are not whitish. The cubital fork is much longer; the middle cross-vein is placed near the middle of the discoidal cell, and the 3rd posterior cell is more narrowed at end.

Described by me from Willowmore, Cape Colony, in my paper on the Bombyliidae of the Museum of Budapest, there is a denuded female specimen from the Transvaal, Junction Crocodile and Marico Rivers, February, 1918 (R. Tucker).

#### GERON, Meigen.

Even this genus seems to be very numerous in South Africa, being represented in the collection by no less than 5 species. It is interesting



to note that besides the widely spread *G. hybridus*, all the other species belong to the group in which the cubital fork is long and narrow; this group seems therefore to be characteristic of the South African fauna. The species may be distinguished as follows:

- 1 (2). Wings proportionally short, with the cubital fork short and broad, the second submarginal cell being at end about as broad as its own length . . . . . *hybridus*, Meig.
- 2 (1). Wings more elongate, with the cubital fork long and narrow, the second marginal cell being at least twice as long as broad at end.
- 3 (8). Antennae entirely black; coxae black; halteres with black knob, at least above in the male; abdomen quite black.
- 4 (7). First antennal joint distinctly thickened and clothed with dense and long hairs; cheeks clothed with very long and dense hairs.
- 5 (6). Wings hyaline, eyes of male touching in a long line, the frontal triangle being small, triangular, grey dusted . . . . . *barbatus*, Bezzi.
- 6 (5). Wings strongly infuscated; eyes touching for a short line, the frontal triangle being broad and deep black . . . . . *luctuosus*, sp. nov.
- 7 (4). First antennal joint very thin and scarcely haired; cheeks not barbate . . . . . *leptocerus*, sp. nov.
- 8 (3). Basal joints of antennae, coxae and abdomen yellow; knob of halteres entirely yellowish . . . . . *dichromus*, Big.

GERON HYBRIDUS, Meigen (1804).

This Mediterranean species is not rare in South Africa; S. Rhodesia, Salisbury, May, 1917 (R. W. E. Tucker); Cape Colony, O'Okiep (L. Péringuey), Transvaal, Barberton, December, 1916 (H. Edwards).

GERON BARBATUS, Bezzi.

Very distinct by the barbate jowls and by the hyaline wings. Described from the Cape in my work on the Bombyliidae of the British Museum; there are specimens from Cape Colony, O'Okiep and Kuysna, October, 1916 (L. Péringuey).

GERON LUCTUOSUS, sp. nov.

Closely allied to the preceding species, but at once distinguished on account of its strongly infuscated wings.

Type ♂ and type ♀ from Basutoland, Maseru (Mrs. Dieterlen).

♂, ♀. Length of the body 5-6 mm.; of the wing 5-6 mm.; of the wing spread 12-14 mm. Head black, with a dark grey dust; occipital border above and vertex with long, erect, black hairs. Eyes of male touching for a line as long as the ocellar triangle, while in *barbatus* this line is twice as long and more; they are narrowed above, the head in profile presenting the characteristic outline of the genus; eyes of female broadly separate. Frons grey dusted, broadening

forwards, being near the antennae more than twice as broad as at vertex. Face clothed with a dense grey dust and distinctly whitish below, like the mouth borders; it is bare in the middle, but at sides below are long and dense black hairs which are directed forwards and in contact with the whitish hairs of the genae, thus forming the characteristic beard; lower part of the occiput likewise white-haired. Antennae entirely black, but in the case of the types the 3rd joint is wanting; 1st joint long, distinctly thickened, and clothed with very long and dense black hairs which are more dense, more rigid and directed forwardly on the underside; 2nd joint short and globular; in the female the first joint is less thickened and less hairy than in the male. Proboscis black, 1.5–1.8 mm. long; palpi very thin and long, one-jointed, almost bare. Thorax and scutellum entirely deep black, opaque; in the middle of the back there is in front a grey longitudinal stripe, much broader than that of *barbatus*; the back is clothed with long, erect, black hairs, but in front and on sides with pale yellowish ones, and under the hairs there is a short, golden-yellowish scattered dust; pleurae with the pale hairs more numerous, but devoid of golden dust; no distinct bristles. Squamulae whitish, with black border and with long white hairs; halteres yellowish, with the knob black above in the male, but entirely whitish in the female. Abdomen of elongate conical shape, coloured and clothed like the back of mesonotum, but with more pale hairs at base and on sides; the golden dust is, moreover, very abundant in the male; venter grey, pale-haired; male genitalia with shiny black lamellae. Legs with black coxae, femora and tarsi; tibiae and base of praetarsi dark reddish; femora with yellowish scales and pale hairs; spicules of tibiae very small. Wings with the veins entirely black to the base; they are strongly infuscated, chiefly at base and at fore border, and moreover along the veins. Cubital fork  $2\frac{1}{2}$  times as long as broad at end; middle cross-vein placed near the middle of the upper border of the discoidal cell; apical cross-vein of the discoidal cell very sinuous and very oblique; apical stalk of the anal cell rather short. The greyish prae-discoidal spot is very striking, passing into the blackish 2nd basal cell. The base of the upper branch of the 3rd longitudinal vein is nearly above the upper end of the apical cross-vein of the discoidal cell, while in *barbatus* it is beyond, and in *hybridus* very much beyond.

GERON LEPTOCERUS, sp. nov.

Nearly allied to the two preceding species, but distinct by the less barbate genae and by the very different antennae.

Type ♂, a single specimen from Transvaal, Barberton, December, 1916 (H. Edwards); a damaged male specimen from Basutoland, Likhoele (Dieterlen) seems also to belong here, but has the knob of halteres entirely whitish above.

♂. Length of body 6 mm.; of wing 6 mm.; of wing spread 13 mm. Head black; eyes in profile much narrowed above and touching for a very long line, even longer than in *barbatus*; the hairs of occipital border and of vertex are scarce, short, darkish; ocellar tubercle black and very small; frontal triangle very small and grey-dusted. Face very narrow, a little prominent, clothed with dense, whitish tomentum, quite bare even on the sides; the genae with scarce, white hairs which are directed forwards; lower part of the occiput with long white hairs. Antennae entirely black; first joint long and thin, not broader than the third, with scarce, short, darkish hairs; second joint globular, third joint linear, gradually tapering into a long point; it is twice as long as the first. Proboscis black, 1.5 mm. long; palpi black. Thorax and scutellum dull black, the former more gibbose than in the two preceding species; the hairs are whitish, and the short dust below them is whitish, not golden; no distinct bristles. Squamulae whitish, with yellowish border and with white marginal hairs; halteres yellowish, with the knob black above. Abdomen black, narrowly yellowish at base of venter, and clothed like the thorax; genitalia entirely reddish. Legs in the greatest part reddish, only the four front femora being more or less blackened; the coxae are reddish on the apical half; hairs and dust whitish. Wings greyish-hyaline, iridescent, with pale yellowish stigma; veins dark, with yellowish base. Cubital fork twice as long as broad, obtuse at base, with the upper branch rounded at base, and originating much beyond the upper end of the apical cross-vein of the discoidal cell; middle cross-vein beyond the middle of the rather elongate discoidal cell, the terminal vein of which is S-shaped but not much oblique. Stalk of anal cell moderately long.

GERON DICHROMUS, Bigot (1892).

Very distinct from all the other known South African species of the genus on account of its prevalent yellowish colour.

Described with a query from South Africa, I think that a single male specimen from Aus, S. West Protectorate, 1916 (Dr. Knobel), may be referred to it, even if it has the wings quite hyaline. I give a description of this specimen.

♂. Length of body 6 mm.; of wing 6 mm.; of proboscis, 2.5 mm. Head black; occiput with scarce and very short dark hairs above like

the vertex; eyes of typical form, but not much narrowed above, touching for a space longer than the ocellar tubercle; frontal triangle much narrower, longer than broad, of a dark grey colour; face narrow, not prominent, quite bare, even the genae being furnished with very scarce, whitish hairs like those of the lower part of head. Antennae long and thin; first joint thin, very scarcely pilose, entirely reddish-yellow; second joint globular, reddish-yellow; third joint elongate, linear, gradually tapering to a point, entirely black. Proboscis black. Thorax and scutellum entirely black, but as it seems, they are entirely clothed with dark grey dust and with whitish hairs. Squamulae and halteres dirty whitish, the latter with an entirely yellowish knob. Abdomen with the sides and the venter entirely reddish, but the middle of the back black, grey-dusted, with the hind border of the segments reddish; it seems to be dusted and hairy like the back of mesonotum; end of abdomen and genitalia entirely reddish. Legs and coxae entirely yellowish, only the last 4 tarsal joints being black; they are clothed with whitish scales on femora, and with scarce whitish hairs. Wings quite hyaline, iridescent, with a pale yellowish stigma; the veins are yellowish at base, dark in middle and at end, and show no trace of fuscous margination. Cubital fork  $2\frac{1}{2}$  times as long as broad at end, obtuse at base, its upper branch originating at a right angle a little beyond the upper end of the apical cross-vein of the discoidal cell, and rounded at base; middle cross-vein placed beyond the middle of the discoidal cell; discoidal cell long and narrow, its terminal vein deeply S-shaped but not much oblique; apical stalk of the anal cell short.

#### APOLYSIS, Loew (1860).

A very distinct genus, well described and figured by Loew in his great work.

#### APOLYSIS HUMILIS, Loew (1860).

A very small fly, at once distinguished by its generic characters. Originally described from Caffraria and the Cape. There are in the collection some specimens from Cape Town (L. Péringuey).

### SUBFAMILY SYSTROPINAE.

#### SYSTROPUS, Wiedemann.

This important genus is represented by 3 species, one of which is described here as new. There are rather numerous South African species described; but some confusion has arisen between them, chiefly

about the interpretation of the *S. macilentus* of Wiedemann. This species is indeed figured by its author as having only 2 marginal cells, while the type at Berlin is said to have 3 of these cells; it seems that Macquart, Loew and Schiner have all comprised different species under the same name. I give here the following table of the known South African species, to clear up the position of the new species, and considering all the species as different, according to the characters given by the authors:

- 1 (10). Three submarginal cells present.
- 2 (9). The cross-vein forming the third submarginal cell unites the upper branch of the cubital fork with the second longitudinal vein.
- 3 (4). Eyes of the female narrowly separated; wings broadly yellow at base and at fore border . . . . . *marshalli*, Bezzi.
- 4 (3). Eyes of the female touching as usual; wings not yellow.
- 5 (8). Front coxae yellow, and moreover there is a yellow stripe above them on the prothorax; first posterior cell distinctly narrowed at end.
- 6 (7). Abdominal stalk black above; wings rather infuscated.  
*leptogaster*, Loew.
- 7 (6). Abdominal stalk entirely reddish-brown; wings more clear.  
*clavatus*, Karsch.
- 8 (5). Front coxae red; no yellow prothoracical stripe; first posterior cell not at all narrowed at end . . . . . *sanguineus*, sp. nov.
- 9 (2). The above-named cross-vein is placed before the cubital fork, uniting its stalk with the second longitudinal vein.  
*macilentus*, Schin. (nec Wied.).
- 10 (1). Two submarginal cells only present.
- 11 (14). Eyes narrowly separated, or only approaching above near the ocelli.
- 12 (13). Wings wholly infuscated . . . . . *macilentus*, Wied.
- 13 (12). Wings with a sharply defined dark fore border . . . . . *crudelis*, Westw.
- 14 (11). Eyes touching for a long line.
- 15 (16). No yellow spot above the front coxae.  
*miobrochus*, Speis., *macilentus*, Macq. (nec Wied.).
- 16 (15). A yellow spot above the front coxae . . . . . *snowi*, Ad.

SYSTROPUS LEPTOGASTER, Loew (1860).

A typical male specimen from Durban, April, 1913 (W. Haygarth).

SYSTROPUS SANGUINEUS, sp. nov.

A middle-sized species of *Ammophilus* facies, distinguished by the prevailing red colour of body and legs.

Type ♂ from Stellenbosch, November, 1887 (L. Péringuey), and an additional specimen of same sex from O'Okiep. I think that the present species may be the *macilentus*-type of Berlin, which is described by Karsch and by Speiser, in spite of Wiedemann's figure, as having 3 submarginal cells.

♂. Length of the body 14–15 mm.; of the wing 6·8–7 mm.; of the wing spread 15·5–17 mm. Occiput bare, dull black, with a faint, dark grey dust near the border; the very small, less prominent, bare ocellar tubercle is red. Eyes united for a space about as long as the frontal triangle; the latter narrow and very acute above, bare, red, with a tuft of short dark hairs in the middle; mouth sides silvery, shining, red on terminal and pale yellowish on basal half and on fore border of chin, which is black with scattered darkish hairs like the lower part of the occiput. Antennae with the first joint as long as the two following joints together, red, with short blackish hairs; second joint black, one-fourth as long as the first, third joint black, three times as long as the second, narrowly oval and flattened. Proboscis black. Thorax deeply punctulate on the back and therefore rather dull; it is black in centre, red on sides and in front of the scutellum; the black of centre runs in front as a narrow point to the junction of head. Pleurae red, with a broad black patch on mesopleurae, continued as a stripe in front below the humeri; the metasternum is broadly black behind, and is clothed with silvery, shiny pubescence; the back of mesonotum has a short, pale yellowish pubescence, like the mesopleurae. Squamulae brown, with scarce dark hairs at border; halteres with dark yellowish stalk, and with the knob pale yellowish below, black above. Scutellum entirely black, like the mesophragma; lateral callosities yellow. Abdomen with a long cylindrical stalk formed by the hind half of the first segment, and by the whole of the second, of the third and of the fourth segment, the terminal club being thus formed by three segments only; first segment with the broad basal half black, punctulate and pubescent like the back of mesonotum, but with a red transverse stripe at the extreme base; the rest of the first segment as well as the whole of the abdominal stalk to the end of the fourth segment are entirely red above and below; the fifth, sixth and seventh segments are black, rather shiny, but the fifth is broadly red on the sides below in front. Genitalia red above, black below, with the prominent, spine-like lamellae black. Legs and coxae entirely red, but the front coxae are bristly black on the front side; the 4 terminal joints of the tarsi are blackened; hind legs with the tibiae black on the thickened terminal part, and with the tarsi entirely black; spines of hind tibiae 2:5:2. Wings greyish-hyaline with two distinct yellowish longitudinal stripes, one along the upper part of the first basal, the base of the marginal and almost the whole of the first submarginal cell except at its end; the second along the base of the second basal and the upper part of the anal cell; subcostal cell and stigma dark yellowish. Upper branch of the cubital fork originating

at a right angle, afterwards bent at right angle and there with the cross-vein uniting it to the second longitudinal vein; the rest is strongly S-shaped. Middle cross-vein on the middle of the discoidal cell; first posterior cell as broad at end as at base; second posterior cell in the shape of a regular rhomb; discoidal cell small and acute, its terminal cross-vein being S-shaped and oblique; stalk of the anal cell long.

*SYSTROPUS SNOWI*, Adams (1905).

A male example from Zululand, M'Fongosi, May, 1916 (W. E. Jones).

An example seen and named by Adams from Salisbury (June, 1911), S. Rhodesia, is in the collection.

## SUBFAMILY TOXOPHORINAE.

### TOXOPHORA, Meig.

Illig. Mag. f. Insect., ii, p. 270, 1803.

The species may be distinguished as follows :

1. (2) Wings devoid of a distinct fuscous pattern, only with a faint yellowish tint on the fore half . . . . . *maculata*.
2. (1) Wings more or less infuscated, sometimes with the fore half black, and usually with dark spotted cross-veins.
3. (6) Wings faintly infuscated, with very striking dark spotted cross-veins.
4. (5) Cross-veins broadly infuscated in the shape of rounded spots of greater size . . . . . *punctipennis*, Bezz.
5. (4) Cross-vein not so much spotted . . . . . *diploptera*, Speis.
6. (3) Wings with the fore half blackish, the cross-veins being thus included in the general suffusion . . . . . *caeruleiventris*, Karsch.

### *TOXOPHORA MACULATA*, Rossi (1790).

A male from Van Wyk's Vlei, Cape Colony, 1875, is the first authentic specimen which I have seen from Africa of this Mediterranean species.

had been already recorded from the Cape by Loew.

### *TOXOPHORA PUNCTIPENNIS*, Bezzi.

Closely allied to the preceding species, but distinct by the absence of white scales on the outer side of the antennae, and chiefly by the three rounded, blackish spots on the cross-veins.

Described by me from Natal in my work on the Bombyliidae of the British Museum. There is a specimen from M'Fongosi, Zululand, May, 1916 (W. E. Jones).

TOXOPHORA DIPLOPTERA, Speiser (1910).

A species very like *T. maculata*, from which it is distinguished by the bluish-scaled body, and by the infuscated and dark spotted wings.

Originally described from Usambara, but widely distributed in South Africa. I believe that Loew mistook the present species for *maculata*. Damaraland, Grootfontein, December, 1918 (R. M. Light-foot); Bulawayo, S. Rhodesia, September 3rd, 1913; M'Fongosi, Zululand (W. E. Jones). The female only has white scales, while in the male those on the middle abdominal stripe are yellow, as also those at the end of the side stripes.

TOXOPHORA CAERULEIVENTRIS, Karsch (1887).

A beautiful species, at once distinguished by the blue and white striped abdomen, and by the blackish fore border of the wings.

Originally described from Delagoa Bay, there is a male from Bulawayo, S. Rhodesia, February 11th, 1912. The spines of the legs in the male are typical, but the middle femora have no spines.

SUBFAMILY CYLLENINAE.

NOMALONIA, Rondani (1863).

The present genus was founded by Rondani on *Cyllenia afra* Macquart, non Wiedemann; and it is very fortunate that the collection contains the two insects of Macquart, which are very different from that of Wiedemann; we are therefore able to clear up the great confusion in Dr. Kertész's Catalogue, pp. 69, 70.

The genus is evidently connected with *Cyllenia*, with which it agrees apparently in the venation, having, however, a long praefurca; but it is distinguished by the broad body, which is devoid of long bristles on the abdomen, by the bare face, the very different shape of the antennae, and the long proboscis. In these characters it agrees with *Henica*, from which it is separated here only as a tribute to the memory of Rondani.

The principal features of the genus are: Three well-developed ocelli disposed in an equilateral triangle. Frons of the male narrowed at the vertex, but very broad on the fore part; that of the female



broad. Face short, bare; genae with a very deep furrow, as in *Cyllenina*; occiput less developed than in this genus, but likewise furrowed above. Antennae inserted at the level of the centre of eyes, approximate at base; first joint globular, bare, as long as the second; third joint very elongated and bare at end. Proboscis twice as long as the head; palpi well developed. Thorax and scutellum with bristles on the sides and at the hind border; metapleurae bare, squamae rudimentary. Abdomen broad, destitute of long bristles; male genitalia much developed and prominent. Legs with spinose femora and spinose tibiae; pulvilli rudimentary, while in *Cyllenina* they are well developed. Wings with rudimentary alula; first longitudinal vein scaled at the base like the costa; second vein curved at end, but not recurrent; a single marginal and 3 submarginal cells; discal cross-vein placed on the last fourth of the discoidal cell; 4 posterior cells all open, but the first being at the end and half as broad as the second; discoidal cell obtuse outwardly, its terminal vein being straight and a little longer than the distal cross-vein; anal cell open, but narrowed at the end; ambient vein entire. The second longitudinal vein springs from the third at a right angle and has often the stump of a vein; the praefurca is very long.

NOMALONIA AFRA, Macquart (1840).

A robust species of proportionally great size, easily recognisable by the fenestrate wings with a single marginal cell.

Macquart has described the male from the Cape, believing wrongly that he had before him *Henica longirostris* = *Cyllenina afra*, Wied. There is in the collection a pair from Namaqualand, Springbok (Cape) November, 1890 (R. M. Lightfoot). To Macquart's description must be added: Length of body 11–13 mm.; of a wing 11–12 mm.; of the wing spread 26–30 mm. Occiput red, with a broad yellow border near the eyes, which becomes broader below; this border is margined with a black stripe on the upper end, and more broadly in the female; it is closed with dense but short white hairs, the eyes' border, however, being bare; it is deeply excavated above in the middle, forming a deep furrow, from which springs the ocellar tubercle. Ocellar tubercle ovate, greatly developed and very prominent, black on the fore-half and reddish behind, black-haired in front. Eyes purplish-black, proportionately small, with equal areolets in both sexes. In the male the frons at the narrowest point is about as broad as the distance between the 2 basal ocelli; in the female it is about  $\frac{1}{5}$  of the head-breadth; the frons becomes afterwards very broad, being equally

broad in both sexes and measuring about  $\frac{1}{3}$  of the head; at a level with the antennae; it is very convex, and densely clothed with white or whitish thick hairs, with some black ones in the basal half, more numerous in the female; the colour of the frons is a pale yellow like that of the face and of the cheeks, with a faint white dust. The face and the cheeks are bare and rather shining; a deep furrow divides the prominent mouth-border from the reddish genæ, which are clothed beneath with short yellowish hairs, like the chin. Antennae inserted in a depression between the arched frons and the prominent face; first joint short, globose, bare, pale yellow; second joint shorter and smaller, reddish; third reddish, with the styliform terminal part black, in the female entirely black, three times as long as the first two together, linear, gradually tapering to a styliform point. Proboscis 3.5 mm. long, entirely black; acute; palpi thick, straight, black, not prominent but long, clothed with yellowish hairs. The praesutural, supra-alar and postalar bristles are long and numerous; there is besides a very dense tuft of short bristles on the upper border of the mesopleura, just below the notopleural line; scutellum with 6-8 pairs of strong marginal bristles; all the above-named bristles are black in colour. Pleurae entirely reddish, grey-dusted, with scarce scaly tomentum on mesopleura and sternopleura, yellowish or whitish in colour like that of the back. The small squamae are whitish, with short, whitish fringe. Abdomen broadly conical in the male, obtuse and more flattened in the female; its ground-colour is red, but each segment has a broad basal black band in the middle; in well-preserved specimens the whole abdomen is clothed by dense, scaly tomentum, which is white on the venter, sides and end, and much darker-yellowish above and at the base; on the sides and at the end there are short black bristles. The male genitalia are very long and prominent, red, black and pale-pubescent, and surrounded at the base with black bristles; female genitalia with dense and long anal tuft of golden-yellow hairs. Legs reddish, irregularly darkened and blackened, pale tomentose; they have numerous and strong black bristles on all the coxae; the femora underneath bear two rows of bristles, shorter and less numerous on the front pairs: tibiae with many rows of long spines, like the underside of the tarsi at the base. The three last joints of the front and middle tarsi with a peculiar structure; in the male they are of a semilunar form, and are provided below with a dense and soft fringe without bristles, with the exception of a single strong bristle at the base of the third segment. Claws strong and short, black, with dark-reddish base. The wings are greyish-hyaline, more or less infuscated towards the middle, but not at the end as in

*longirostris*, and hyaline around the transverse veins; the veins are pale yellow, darkened at end; the scaly hairs on the base of the costa and first vein are yellowish; there is sometimes the recurrent stump of a vein in the basal angle of the second longitudinal vein.

HENICA, Macquart (1834).

The characters of this genus and the differences from *Cyllenina* have been pointed out by Loew under the name of *Lagochilus*; Loew has also noticed the length of the praefurca, or, as he says, the shortness of the first submarginal cell. This character shows an affinity between *Henica* and *Nomalonina* and the true *Exoprosopinae*, and it is important to note that Wiedemann first described the species as belonging to *Anthrax*. Both genera have a rather isolated position in the Cylleninae.

HENICA LONGIROSTRIS, Wiedemann (1878).

A well-known, common South African species, very distinct owing to the peculiar venation.

A couple of specimens from the Cape, Hex River, November, 1882, labelled by Bigot "*Cyllenina pluricellata*, Macq.;" another female specimen from Stellenbosch (Cape), L. Péringuey.

The four anterior tarsi of the male have the same structure as described above for *Nomalonina afra*.

PERINGUEYIMYIA, Bigot (1886).

A genus briefly described by Bigot, and with affinity to *Amictus*, from which it differs chiefly in the recurrent, strongly looped end of the second longitudinal vein, and in the long, strongly curved and appendiculate upper branch of the cubital fork. The structural features of the genus are as follows: Body broad and stout; abdomen depressed. Head with the occiput much inflated above; the middle longitudinal furrow of the vertex is present, but it is much less pronounced than in *Cyllenina*; ocular border bare. Ocellar tubercle less prominent, with three well-developed ocelli, disposed in an equilateral triangle. Eyes bare, with non-indented hind border and with the upper areolets distinctly enlarged in the male; they are closely approximate together for a long distance, but not touching in the male and not broadly separate in the female. Vertical triangle of male small—many times smaller than in *Henica* or in *Nomalonina*. Face short, not prominent, with a fine moustache of dense hairs on the sides

and on the mouth-edge; cheeks and chin narrow; mouth-opening long. Antennae short, inserted over the centre of the eyes, approximate at the base; first joint thickened, provided with a tuft of very long and dense hairs below; second short and globular; third joint much smaller and a little longer than the first, with the basal half ovate and the apical half styliform. Proboscis short and thick, not longer than the head, with broad terminal labella; palpi thin and rather long. Thorax villose, with long but not rigid praesutural, supra-alar and postalar macrochaetae; scutellum with bristles at the hind border; metapleurae and hypopleurae bare and shining. Squamae short, but well developed and fringed. Abdomen villose, but without bristles at the hind border of the segments. Male genitalia of great size and complicated, but not prominent. Legs stout, with spinose femora and tibiae; pulvilli well developed, long. Wings long, with no distinct alula; second longitudinal vein much looped at the end and retreating, reaching the costa nearly in contact with the first vein, the marginal cell being therefore very broadened at end but almost closed; praefurca very short; upper branch of cubital fork very retreating at base, and there angulate and provided with a recurrent stump; distal cross-vein placed in the last third of the discoidal cell, which is long, and with the vein dividing it from the third posterior cell very long and S-shaped. First posterior cell closed at border, anal cell open but narrowed at end; axillary lobe proportionally short; ambient vein complete. There are 2 sub-marginal and 4 posterior cells present.

PERINGUEYIMYIA CAPENSIS, Bigot (1886).

A rather hairy species, reminding one of *Nomalonia afra*, and at once distinguished by the black punctate wings.

Originally described from the Cape, there are 1 male from Namaqualand, Springbok, November, 1890 (R. M. Lightfoot), a male from Garies (Cape), November 28th, 1885 (L. Péringuey), labelled by Bigot (type); and another female from Bushmanland, Jackal's Water, October, 1911 (R. M. Lightfoot).

Length of body 9–12.5 mm.; of wing expanse 20–26 mm. Head entirely black; occiput rather shining, grey-dusted near the eye-borders, with short pale yellowish hairs; ocellar tubercle black and black-haired; frontal triangle of male bare, densely grey-dusted. The linearfrons between the eyes is not broader than the front ocellus. Frons of female at the vertex not more than  $\frac{1}{7}$ , and at the base of antennae  $\frac{1}{3}$  of the head, shining black, black-haired near the ocelli, white-haired on

the remainder, more densely near the antennae. Hairs of moustache white or pale yellowish. Antennae entirely black; the short hairs on their upper side are black, very long and dense; the hairs of the under side are white; proboscis and palpi black. Thorax and pleurae entirely black; the back is clothed with a rather long and dense, pale yellowish or dirty whitish pubescence, and with a little longer, numerous black hairs. The bristles are black; some have yellowish tips; the pleurae are shining, with tufts of whitish hairs only on the propleurae and the hind border of the mesopleurae. Scutellum red, with a narrow black base, and bearing a pale yellowish pubescence, longer black hairs, and yellowish bristles along the hind border. Squamae dirty yellowish, with golden or whitish yellow fringe; halteres with a dark stalk and whitish knob. Abdomen black, with the hind border of each segment, the first excepted, with a narrow but complete reddish-yellow band, which is broader in the male; venter black, grey-dusted, with long whitish hairs. The pale yellowish or whitish pubescence of the upper side is rather long and dense, chiefly on the sides of the first segment; in the female the pubescence on segments 1-5 is quite white, and forms short bands on the ventral side of the hind border of the tergites.

Male genitalia red, the end of the abdomen in this sex is black pilose below; the ovipositor of the female appears provided with a circlet of long spines, like that of some *Exoprosopinae*. Legs black, grey-scaled; tibiae and basal joints of tarsi reddish yellow; the coxae are densely pilose, the hairs being white above and black below; all the femora are black spinose underneath, like the tibiae; claws black, with a reddish base; pulvilli dirty-yellowish. Wings wholly hyaline, vitreous; veins yellow, darkened outwardly; costa with black hairs at the base, but the first vein is entirely bare. The dark spots are on the short praefurca, on the discal cross-vein and on the angulate base of the upper branch of the cubital fork; three smaller and less distinct spots are situated on the base of the fourth posterior cell, on the inner base of the third posterior cell, and on the base of the second posterior cell; sometimes there is also a less distinct spot at the closed end of the first posterior cell.

## SUBFAMILY LOMATIINAE.

### LOMATIA, Meigen (1822).

The rather numerous South African species of this genus can be divided into three groups, based on the shape of the third antennal joint and on other characters. These groups are different from those proposed by Loew; they are distinguished as follows:

- 1 (2). Wings narrow and long, with the upper branch of the cubital fork angulate at the base and there provided with a recurrent veinlet; discoidal cells three times as long as the second posterior cell and very acute outwardly; third antennal joint in the shape of a very long, acute cone, linear; praesutural macrochaetae black; hind femora with many spines below. (First group) . . . *acutangula*, Loew.
- 2 (1). Upper branch of cubital fork not appendiculated and discoidal cell not more than twice as long as the second posterior cell; third antennal joint not linear.
- 3 (14). Third antennal joint broad at base and afterwards forming a very thin and long styloform point; wings with a more or less extended pattern, with a distinct basal comb and with a rather long discoidal cell; praesutural bristles yellow; hind femora with many spines below. (Second group.)
- 4 (9). Species of great size, with the wing pattern extended to the hind border, and with clear stripes on the fuscous middle area; anal cell with narrow end.
- 5 (6). Legs entirely yellow; wings infuscated, with a whitish end, and a whitish, longitudinal middle stripe . . . *longitudinalis*, Loew.
- 6 (5). Legs entirely black, or with dark-yellowish tibiae or base of tarsi.
- 7 (8). Wings with the fore basal half infuscated and the hind half clear with broad fuscous borders of the veins; body pubescence pale yellowish; tibiae with yellow ground-colour . . . *liturata*, Loew.
- 8 (7). Wings yellow and brown on the disc, with a broad brown, praecipital band and a brown hind border; pubescence bright yellow or golden; tibiae black . . . *pictipennis*, Wied.
- 9 (4). Wing pattern limited to the fore border, not extending in the middle over the fourth longitudinal vein; if the hind border is infuscated, there are no clear stripes in the middle; anal cell less narrowed at end; species of medium size.
- 10 (11). First basal cell infuscated at the base only and first submarginal cell entirely hyaline in the male; antennal tuft with black hairs on the inside . . . *simplex*, Wied.
- 11 (10). First basal cell entirely darkened as far as the discal cross-vein in both sexes and first submarginal cell darkened at base.
- 12 (13). First posterior cell not narrowed at end; wings with the hind half rather infuscated . . . *infuscata*, sp. nov.
- 13 (12). First posterior cell much narrowed at end; wings with the hind half quite hyaline . . . *conocephala*, Macq.
- 14 (3). Third antennal joint in the shape of a short cone; wings entirely hyaline, without basal comb; thorax with black praesutural bristles and provided with a distinct collar of black bristly hairs in front; hind femora with a few bristles below; smaller species, of a deep black colour, with silvery hairs on abdomen. (Third group.)
- 15 (16). Tibiae yellow; pubescence on pleurae and abdomen of a yellowish colour . . . *latiuscula*, Loew.
- 16 (15). Tibiae black; pleurae and abdomen with white pubescence. . . . . *tenera*, Loew.

*LOMATIA ACUTANGULA*, Loew (1860).

Dipteren-Fauna Süd-Afrikas, p. 203, pl. ii, fig. 10.

A species very distinct from any other on account of its slender body and of the very long and narrow wings, which have besides a peculiar venation.

Originally described from Caffraria, and subsequently recorded from Pretoria (Transvaal), there are in the collection some specimens from M'Fongosi, Zululand, February and December (W. E. Jones).

In the present species the middle femora have 2 strong spines in the middle of the fore side, and the hind femora 3-4 spines below. The hitherto undescribed male is very like the female; the eyes are more approximate but always more distinct than in the allied species; the ocellar tubercle is curiously shaped, with a prominent border behind.

*LOMATIA LONGITUDINALIS*, Loew (1860).

Dipteren-Fauna Süd-Afrikas, p. 204, pl. ii, fig. 11.

A gigantic species, very different from any other by having wholly yellow legs. Originally described from Caffraria, there is a male specimen from Berg River (Cape).

Middle femora with 4, hind femora with 8-9 spines.

*LOMATIA LITURATA*, Loew (1860).

Dipteren-Fauna Süd-Afrikas, p. 205, pl. ii, fig. 13.

A species distinguished by the yellowish tibiae and by the peculiar, often less pronounced coloration of the wings. Described from the Cape, and recorded with a doubt from Barberton (Transvaal), there are a couple of specimens from Potchefstroom (Transvaal) (T. Ayres).

Middle femora with 5-6, hind femora with 7-8 spines.

*LOMATIA PICTIPENNIS*, Wiedemann (1828).

Loew's Dipteren-Fauna Süd-Afrikas, pl. ii, fig. 12.

A well-known species, easily recognisable by the black legs and the very variegated yellow and brown wings.

Common in South Africa; M'Fongosi, Zululand, December, 1911 (W. E. Jones); I have received it also from Grahamstown, March, 1909 (Miss Dale).

Middle femora with 3, hind femora with 5-6 spines.

*LOMATIA SIMPLEX*, Wiedemann (1819).

A smaller species, very distinct from the others of the present group owing to the reduced wing pattern of the male, the first basal cell being darkened at the base only.

This species seems to be common in South Africa; there are many specimens of both sexes from Barberton, Transvaal, December, 1911 (H. Edwards); a large male specimen from Hex River (Cape) is labelled by Bigot as *Anthrax albifrons*, n. sp.; it has a wholly yellow antennal tuft. The present species is variable in the coloration of the hairs on the face and frons, which in the male are often white, not yellow; in the female the hairs of the under side of the first antennal joint have usually no black hairs on the inner border, while in the male they have such as in *pulchriceps*. Middle femora with 2-3, hind femora with 3-4 spines.

In the female the wings are more infuscated; the first basal cell is fuscous to the end, and the second basal cell, and often even the discoidal cell, are also infuscated.

*LOMATIA INFUSCATA*, nov. sp., ♀.

A rather large species, distinct from the others by the wholly infuscated wings, which are destitute of clear stripes, but show a distinct fuscous pattern, of the type of that of *pulchriceps*.

Type ♀, a single specimen from Pinetown, Natal, June, 1883 (G. H. Bowker).

Length of body 10.5 mm.; of a wing, 10 mm. Occiput shining black, with faint grey dust; scarce golden tomentum and short yellowish hairs along the borders of the middle depression. The longitudinal furrow behind the vertex is narrow but deep; ocellar tubercle brown, with a prominent hind border, black haired; frons shining black and black pilose, with a transverse band of golden hairs above the base of the antennae. Face and cheeks black, with golden hairs; chin black, almost bare. Antennae entirely black; first joint black and briefly hairy on the upper side, with a long tuft of rigid golden hairs underneath and with black ones intermingled on the inner side; third joint at the base as broad as the second, gradually tapering in a long styliform point, which is of a reddish colour at end. Proboscis and palpi black. Thorax and scutellum deep black, densely clothed with golden yellow hairs; the bristles are yellow or dark yellowish, but the 2 praesutural ones on the right side are quite black (in 2 specimens of the British Museum these bristles are, however, entirely yellow, which may be the rule); pleurae black, densely grey-dusted,



with golden yellow hairs on propleura, mesopleura and sternopleura. Squamae black, with golden fringe; halteres dark yellow, with paler knob. Abdomen entirely black, a little shining, broader than the thorax, with faint bands of golden tomentum at the hind border of the segments, and with golden-yellow hairs dense and long on the sides and long black hairs intermingled after the middle; venter black, grey-dusted and yellow-haired; genitalia with a dense and long tuft of metallic shining hairs. Legs entirely black, with dense yellowish scaly tomentum on femora and outer side of tibiae; all the spines are black; middle femora with 4, hind femora with 2-3 spines; claws short, black; pulvilli blackish. Wings long, shining, iridescent, rather infuscated over the entire surface (but it is possible that in the yet unknown male they are clear at the hind border, because in the present genus the females have the wings always darker than the males); the usual pattern, filling out the fore border and the first basal cell to the discal cross-vein, is distinct and very dark; venation typical. First posterior cell not narrowed at end; discoidal cell more than twice as long as the second posterior cell; third posterior cell very narrow and long; anal cell narrowed at end, more than in the applied species. Base of wing blackish; basal comb less developed.

*LOMATIA CONOCEPHALA*, Macquart.

Dipt. Exot., ii, p. 62, pl. xx, fig. 1 (1840).

Easily distinguishable from the allied species by the much narrowed end of the first posterior cell and by the infuscated lower end of the second basal cell.

Macquart has described in an unrecognisable manner the female from the Cape as *Anthrax conocephala*; but as the figure represents without doubt the wings of a *Lomatia* of the present group with a narrowed end of first posterior cell, I think that this name should be retained for the present species. There is a male from Smithfield, Orange Free State, September, 1910 (Dr. D. Kannemayer).

Occiput black, briefly black-haired above and grey-haired on sides; frons black, with the basal half black-haired, the apical half with long, pale-yellowish, sericeous shining hairs divided along the middle line and directed outwards. Antennae black, the hairs of the lower side of the first joint being entirely yellowish like those on face and cheeks. Hairs of thorax pale-yellowish on back and whitish on sides; bristles yellow. Scutellum black, haired as the thorax. Squamae dirty-whitish, with brown border and dense white fringe; halteres yellowish, with whitish knob. Abdomen entirely black, hairy like the thorax,

with black hairs intermingled at end; the hairs are dense and long on the sides, and have a white sericeous sheen; venter grey-dusted and pale yellowish tomentose, with scarce but long pale hairs. Legs entirely black, yellowish or whitish scaled, with pale hairs on coxae and under side of femora, and with black spines; middle femora with 4-5, hind femora with 5-6 spines; claws black, pulvilli blackish. Wings hyaline, with a long, black basal comb and black veins; costal cell, marginal cell to the end of the first vein, first submarginal cell at base and first basal cell to the distal cross-vein infuscated; base of wing infuscated above and yellowish below; second basal cell infuscated at base, at the fore-border and on the vein dividing it from the fourth posterior cell; first posterior cell much narrowed at end, nearly as narrow as the anal cell; discoidal cell twice as long as the second basal cell.

LOMATIA PULCHRICEPS, Loew (1860).

Closely allied to *conocephala*, Macq., but distinguished by the black and stout prae-alar bristles, and by the white tufts below the antennae.

A specimen from Salisbury, Arcturus, 1916 (Dr. Melle), and another from M'Fongosi, Zululand (W. E. Jones).

LOMATIA LATIUSCULA, Loew (1860).

A smallish, deep-black coloured species, very like a little *Thyridanthrax* with hyaline wings, easily distinguishable from the allied species by its yellow tibiae.

Described from the Cape. I have received a specimen from Grahamstown (Cape), February, 1903 (Miss Dale and Miss M. Soly).

In this species the bristles of the collar in front of the thorax are thin and yellow, but the praealar bristles are strong and black. Middle femora with 1, hind femora with 1-2 spines; the spicules of the 4 hind tibiae are very long and strong, but less numerous than usually.

LOMATIA TENERA, Loew (1860).

Nearly allied to the preceding, but at once distinguished by the black collar in front of the thorax and by the entirely black legs. Originally described from Caffraria, there is a single male specimen from Bulawayo (South Rhodesia), December 11th, 1911. The femora are as in the preceding species; the tibiae have numerous but thin spicules.

PTERAULAX, gen. nov.

The present new genus is very near *Cononedys* and *Aphoebantus*; with them it forms a small group distinct in having no prominent face, separated antennae, united eyes of male, a folded wing membrane, short praefurca, and the second vein originating at an acute angle. In general shape, however, this group agrees perfectly with that of *Plesiocera-Stomylyomyia* and with that of *Petrorossia-Chionamoeba*; and therefore I place all these 3 small groups of Becker with *Lomatia* in a single group of Lomatiinae.

The structural features of the new genus are as follows: Head nearly spherical, broader than the thorax. Occiput convex and prominent, with a very deep post-vertical furrow, bilobate above; it is excavated in the middle and destitute of fringe at the border. Eyes bare, of great size, with a very developed indentation in the middle of the hind border and with a well-developed bisection line; in the male they have the upper inner areolets much broader and are united for a rather long line; in the female they are broadly separated and have equally small areolets. Ocellar tubercle prominent but small, ovate, with three equidistant ocelli. Face broad, long, not prominent, pilose; genae very narrow; chin broad and flat, destitute of long beard. Antennae short, inserted a little above the middle of the eyes; they are broadly separated at the base, but the first joint shows a protuberance on the inner side by means of which the antennae are approximate; the hairs of the under side are not tuft-shaped as in *Lomatia*. The second joint is short and globose; the third joint is as long as the 2 first joints together, broadened and rounded at base, and narrowed to form a point half as long as the first, which bears at the end a well-developed, bi-articulate style. Mouth-opening of small size, oval; proboscis very short, shorter than the head, thick, with broad terminal labella; palpi short and strong, less pilose, bi-articulate, the apical joint ovate, about half as long as the first. Thorax convex, with strong and long praesutural and supraalar bristles, and also with 2 pairs of bristles in front of the scutellum; metapleurae bare; squamae rather developed, with short fringe; scutellum developed, with some bristles at hind border. Abdomen of conical shape, in the male very narrow and obtuse, in the female more depressed, broader and acute at end. Male genitalia of great size, rounded, closed; female genitalia with dense tuft of hairs. Hind border of the abdominal segments with more or less developed rows of bristles, more developed in the female. Legs strong; hind femora much spinose beneath; spicules of tibiae long and thin; many long spurs at the

end of the tibia. Claws long; pulvilli well developed. Wings short and narrow, without basal comb, and with the membrane strongly folded (whence the name *Pteraulax*). Base narrow, the alula less developed, but distinct and rounded; praefurca short. Second and third vein at an acute angle; second vein looped at end, but not retreating; cubital fork broad, retreating at the base of the upper branch and united with an appendage to the second vein. Therefore there are 3 submarginal cells, the base of the upper branch of the cubital fork in the shape of a short cross-vein between the appendix and the rest, which are on the same line. First posterior cell closed before the border, acute at end, and provided with a rather long stalk; discoidal cell obtuse at end, less than twice as long as the second posterior cell, the discal cross-vein placed a little before its middle; 2nd, 3rd and 4th posterior cells of equal breadth at end; anal cell long, with parallel sides, narrowed at end but open. Ambient vein complete; axillary lobe well developed.

In the allied *Cononedys stenura*, Loew, there are no pulvilli; but in *C. erythraspis* they are present, and Prof. Hermann has proposed for it a new genus, *Conogaster*—a name which cannot be maintained, because it is preoccupied in the Diptera by Brauer and Bergenstamm, 1892.

Type: The following new species.

PTERAULAX FLEXICORNIS, sp. nov., ♂, ♀.

An *Aphobantus*-like species of middle size, very distinct owing to its singular venation and by the shining black hind part of the scutellum.

Type ♂ and type ♀; a single couple of specimens from Bushmanland, Een Riet (Cape), October, 1911 (R. M. Lightfoot). I have seen in the Museum of Budapest a second species from Willowmore, in which the scutellum is not shining black behind and the abdomen is more setose.

Length of the body 10 mm.; of a wing 7 mm. Entirely black, grey-dusted, and white and yellowish tomentum. Occiput dark grey-dusted above and paler grey below, with short greyish pubescence and white scales on the sides near the eye's indentation. Ocellar tubercle black, grey or brownish-haired. Frons of the male grey-dusted and entirely clothed with whitish hairs, like the face; frons of female shining black, with brownish hairs, with whitish ones like those of the face in front only. Antennae black; first joint with whitish hairs. Proboscis black; palpi yellow. Thorax black; on the back it is dark grey-dusted, with three distinct but narrow longitudinal

stripes of paler dust, one along the middle line, the others along the dorsocentral lines. The hairs in front and on the sides are pale yellowish or whitish; in the female there are besides numerous short bristles on the notopleural line. Pleurae with pale grey dust, and with white scales on the lower part of the mesopleura and on the sternopleura; the mesopleural hairs are greyish. Scutellum grey-dusted at base and with yellow tomentum, shining black at the hind border and on the sides; the bristles of the hind border are yellow or yellowish. Squamae dirty whitish, with pale yellow border and white fringe; halteres yellow, with darker knob. Abdomen black, grey-dusted; the segments have whitish scales at the base on the sides and on the hind border, and yellow scales in the middle; first segment with long, dense, whitish hairs, the other segments with scarce, grey or pale yellowish hairs, more developed in the male. The ventral side of the tergites has a narrow yellow border; venter grey-dusted, white-scaled, with greyish hairs. Male genitalia grey, with the lower border of the lamellae reddish; terminal tuft of the female genitalia of golden yellow colour. Coxae and femora black, grey-dusted, white-scaled, whitish haired; the 4 anterior femora only narrowly yellow at end; middle femora with 3-4 yellow spines on the middle of the anterior side; hind femora with 6-7 whitish or yellow spines below, which in the male are very long, forming near the base a tuft of 4-5 longer ones placed in many rows. All the tibiae are pale yellowish, with numerous and long yellowish or whitish spicules and spurs, even on the front pair. Tarsi pale yellowish, darkened at end, with whitish or yellowish spines at end of the two first joints; claws pale yellowish with black tips; pulvilli whitish yellow, longer in the male than in the female. Wings hyaline, vitreous, iridescent; veins black, the first and the extreme base of the others being yellow; alula pale yellowish, with a short white fringe. In the present species the recurrent veinlet dividing the first from the second submarginal cell is about twice or even a little more as long as the basal part of the upper branch of the cubital fork—looking, therefore, as not being the continuation of the second longitudinal vein.

#### PETROROSSIA, Bezzi (1908).

This genus is well represented in the Ethiopian Fauna, and there are also some species in South Africa; those in the collection can be distinguished as follows:

- 1 (4). Thorax, scutellum and abdomen with yellowish or greyish tomentum abdomen black, but with reddish yellow sides; legs pale yellow.

- 2 (3). Wings hyaline, with a less defined basal infuscation; second longitudinal vein with the usual less deep loop at end *hesperus*, Rossi.
- 3 (2). Wings entirely blackish-brown, with hyaline spots in the centre of the cells; second longitudinal vein exceedingly looped at end.  
*vinula*, sp. nov.
- 4 (1). Thorax, scutellum and abdomen with bright orange tomentum; abdomen of an orange yellow colour, with a black middle stripe; legs orange-colour. . . . . *fulvipes*, Loew.

PETROROSSIA HESPERUS, Rossi (1790).

There is a female of large size of this Mediterranean species from Hex River (Cape) (Dr. L. Péringuey), January 3rd, 1883, but without a head, and it cannot be ascertained if the example belongs to the var. *tropicalis* or not. The wings have the basal half infuscated, and there is a short appendix at the base of the upper branch of the cubital fork.

PETROROSSIA VINULA, sp. nov., ♂, ♀.

Closely allied to the preceding, but at once distinguished on account of its peculiar wing pattern and venation.

Type ♂ and type ♀, a single pair from Hex River (Cape), December, 1889 (Dr. L. Péringuey), labelled by Bigot as "*Lygira vinula*"—a name which has never been published. Bigot has evidently placed the species in the genus *Lygira* on account of the strong terminal loop of the second longitudinal vein; but in this genus the form of this loop is a very different one, the end of the second vein being strongly recurrent; there are, moreover, 4 submarginal cells, and the position of the discal cross-vein is as in *Lomatia*.

Length of body 6.5–8 mm.; of a wing 7.5–9 mm.; of the wing spread 16.5–20 mm. Head black, grey-dusted; occiput well developed, deeply bilobate above, with a short pale yellowish pubescence; ocellar tubercle small, rounded, with blackish pubescence; frons with long, blackish, erect hairs and short yellowish pubescence on fore half; face grey-dusted, with yellowish pubescence. Antennae entirely black, short; first joint black-haired in the male, with some yellowish hairs below in the female; third joint with the basal part broad and discoidal, the styloform part long and ending in a pencil of sparse hairs. Proboscis short, black. Thorax and scutellum entirely black, a little shining, with pale yellowish pubescence, yellow tomentum and yellowish bristles; pleurae with pale grey dust, with whitish hairs on propleura, mesopleura and sternopleura. Squamae dirty whitish, with a pale fringe; halteres yellow. Abdomen black, rather shining, with yellow tomentum and pale yellow hairs; on the sides near the

base there is a narrow reddish-yellow stripe; venter reddish, whitish-haired; male genitalia of great size, bilobate, black above, red below, with yellow hairs. Legs entirely pale yellow, white-scaled; femora and tarsi more or less darkened at end; hairs of coxae and of the under side of femora white; the thin spines of the hind femora and the short spicules of the tibiae are black; claws black, pulvilli whitish. Wings very long, with pedunculate base; the costa is not ciliated at base and the alula is very rudimentary; they are entirely and equally infuscated, the axillary lobe only being hyaline with a dark end. The hyaline stripes are placed on the end of the first and of the second submarginal cells, this last being in contact with the whole wing border between the ends of the two branches of the cubital fork, in the middle of the 2nd, 3rd and 4th posterior cells, and one broader than the others, of ovate shape, in the last half of the discoidal cell; in addition there is the usual whitish spot on the upper exterior angle of the second basal cell. The veins are black; the second longitudinal is suddenly and deeply looped before the end, and its origin is equidistant from the base of the third vein and the discal cross-vein; upper branch of cubital fork gently rounded at base and destitute of stump. First posterior cell long, not, or little narrowed at end; discal cross-vein placed on the first third of the discoidal cell; this last cell is long, very dilated in its last half, and therefore much constricted before the middle; third posterior cell very elongate and very narrowed in its last half; anal cell narrowed at end; ambient vein complete.

PETROROSSIA FULVIPES, Loew (1860).

Dipteren-Fauna Sud-Afrikas, p. 210, pl. ii, fig. 14.

A well-known Ethiopian species, easily distinguished by its elegant coloration. M'Fongosi, Zululand; Natal, Stella-Bush; but the species is common and widely distributed over the entire region; it is hardly distinct from the Oriental *P. fulvula*, Wied.

## SUBFAMILY ANTHRACINAE.

ANTHRAX, Scopoli (1763).

This name is used here, not in the usual sense of the authors (for these species, see *Villa* and *Thyridanthrax*), for the species of *Argyro-moeba* which have a broad third antennal joint, an extended black pattern on the wings and a silvery abdominal apex in the male. The rather numerous species may be tabulated as follows:

- 1 (2). Squamæ dark brown; second longitudinal vein deeply looped at end; upper branch of the cubital fork with a second stump in the middle; wings with many confluent dark spots, 4-5 of which are placed at apex . . . . . *pithecius*, Fabr.
- 2 (1). Squamæ white or whitish; second longitudinal veins less looped at end; upper branch without appendix in the middle, or only as an exception; apex of wings hyaline, without dark spots.
- 3 (6). Basal black pattern of the wings extended over the discal cross-vein, filling out a great part of the marginal cell and the base of the first submarginal and of the first posterior cell; plumula with a black fringe; discal cross-vein placed before the middle of the discoidal cell.
- 4 (5). Wings with the brown pattern well defined and with 4 isolated dark spots, 3 of which placed on the lower vein of the discoidal cell; a hyaline spot in the dark base of the first posterior cell. *hessii*, Wied.
- 5 (4). Wings with a diffused pattern and with only 3 dark spots, 2 of which are on the discoidal cell; no distinct hyaline spot in the dark base of the first posterior cell . . . . . *diffusus*, Wied.
- 6 (3). Basal black pattern not extended over the discal cross-vein; discal cross-vein usually placed on or after the middle of the discoidal cell.
- 7 (10). Two distinct isolated dark spots in the hyaline part of the wings.
- 8 (9). Species of great size, measuring 14-15 mm. in length; recurrent veinlet at the base of the upper branch of the cubital fork long; plumula white . . . . . *aygulus*, Fabr.
- 9 (8). Species of smaller size, measuring only 6-7 mm.; recurrent veinlet at the base of upper branch short and often rudimentary; plumula black . . . . . *pusillus*, Wied.
- 10 (7). No distinct dark isolated spots in the hyaline part of the wings.
- 11 (12). The black basal pattern of the wings is limited by an oblique line extending from the end of the auxiliary vein to the end of the anal cell, the extreme apex of which is hyaline . . . . . *hemimelas*, Speis.
- 12 (11). The black basal pattern reaches only the middle of the anal cell, and has a tooth-like projection on the discal cross-vein. *fuscipennis*, Ric.

#### ANTHRAX PITHECIUS, Fabricius (1805).

A well-known and common African species, easily distinguished by the peculiar wing pattern.

Many specimens of both sexes, varying in size from 8.5 to 12 mm. M'Fongosi, Zululand, October, 1911 (W. E. Jones); Dunbrody (Cape) (O'Neil); Potchefstroom, Transvaal (T. Ayres); Bulawayo, S. Rhodesia (G. Arnold), September, 1913; Salisbury (S. Rhodesia), January, 1914 (J. A. O'Neil). A specimen from Hex River, December, 1882, was determined by Bigot as *Exoprosopa reticulata* Macq. (*sic*!). I have received the species also from Grahamstown (Cape).



*ANTHRAX HESSII*, Wiedemann (1818).

An elegant species, very distinct owing to the well-defined and characteristic wing pattern.

It is known only from South Africa. Giftsberg, Van Rhynsdorp (Cape), September, 1911; O'Okiep (Cape), September, 1890.

A female specimen from Hex River (Cape), December, 1884, determined by Bigot as *Anthrax punctipennis*, Wied., seems to belong to this species, but is aberrant in having the first submarginal and the first posterior cells almost hyaline to the base, and therefore the hyaline spot after the discal cross-vein is wanting.

*ANTHRAX DIFFUSUS*, Wiedemann (1824).

Closely allied to the preceding, but at once distinguished by the less defined and more extended wing pattern, the isolated dark spots being therefore much less marked. Known from South Africa and recorded by me from Nyassa. A single male specimen from Bushmanland, Jackal's Water (Cape), October, 1911 (R. M. Lightfoot); an old specimen of great size (37 mm. of wing expanse), without a head, with wholly infuscated wings.

It is notable that of *A. diffusus* I have seen males only, and of *hessii* females only; they are perhaps the two sexes of a single species.

*ANTHRAX AYGULUS*, Fabricius (1805).

A species of great size with dimidiate wings and two dark spots in the vitreous part.

Widely spread over the entire Ethiopian region, and seemingly also over the whole Oriental region. A single female specimen from Dunbrody (Cape), March 20th, 1912; the species was not yet recorded from South Africa.

*ANTHRAX TRIMACULATUS*, V. der Wulp (1868).

Easily distinguished from the allied species by the presence of three isolated brown spots in the hyaline part of the wings.

A female specimen from East London, Cape Colony, July, 1914 (R. M. Lightfoot).

*ANTHRAX PUSILLUS*, Wiedemann (1821).

Very like *A. aygulus*, but only half its size.

Widely spread in Africa, but less known; very like the Oriental *distigma*, Wied., but smaller. A single male specimen from Hex

River (Cape), January 10th, 1887, labelled by Bigot as *Anthrax pusilla*, Wied. An additional example from Kimberley (Cape), 1918 (J. H. Power).

#### ANTHRAX HEMIMELAS, Speiser (1910).

A black species of small size, very distinct on account of its perfectly dimidiolate wings.

Described at the same time by Speiser from Kilimandjaro and by me as *A. homogeneous* from Nyassa, it is interesting to record it from South Africa. A single female from M'Fongosi, Zululand, December, 1911 (W. E. Jones).

#### ANTHRAX FUSCIPENNIS, Ricardo (1903).

Distinct owing to the reduced black pattern of the wings, which have a tooth-like projection on the fore border, the apical half of anal and axillary cell being hyaline.

A single female specimen from Bushmanland, Henkries (Cape), October, 1911 (R. M. Lightfoot).

This species seems to be widely spread over all the Ethiopian region, but was not recorded from South Africa. It seems that *muscarius*, Klug (*nee* Pallas), from Egypt, *fuscipennis*, Ric., from Sokotra, *dentatus*, Beek, from Egypt and *camptocladius*, Bezzi, from Nyassa are all the same species, the latter one representing a colour variety with entirely black first basal cell, and therefore without a tooth-like projection on the fore border.

#### SPONGOSTYLUM, Macquart (1840).

Under this name I include the species which Becker has placed in his restricted genus *Argyramoeba*; they are distinguished from the preceding genus chiefly in the shape of antennae and in the wing-pattern. All the following species have only 2 submarginal cells and they may be distinguished as follows:

- 1 (2). Origin of the second longitudinal vein placed a little before the discal cross-vein; base of the second vein and of the upper branch of the cubital fork destitute of stumps, or if present they are very short. . . . . *muticum*, sp. nov.
- 2 (1). Origin of second vein just opposite to the discal cross-vein; base of second vein and of upper branch always provided with long stumps.
- 3 (4). No brown spot at the base of the cubital fork or a very indistinct one, abdomen with narrow or less distinct yellow hind border on segments, and on sides, with usually tufts of black hairs, or with very few scales . . . . . *incisurale*, Macq.

- 4 (3). A broad brown spot at the base of the cubital fork; abdomen with yellow hind borders and with tufts of black, scaly hairs on sides.

*punctipenne*, Wied.

*SPONGOSTYLUM MUTICUM*, sp. nov., ♂, ♀.

Closely allied to the following species, but distinguished by the characters of the venation and by the somewhat different wing pattern.

Type ♂ and type ♀ from Bushmanland, Jackal's Water (Cape), October, 1911 (R. M. Lightfoot); a ♂ from Een Riet (Cape), October, 1911; a ♀ from Namaqualand, August, 1873 (R. Trimen).

Length of body 8–10 mm.; of wing 9–11 mm.; of the wing spread 21–26 mm. A description is not necessary, because this species is almost similar to *incisurale*, of which it may be perhaps only a variation. But in the wings there are important differences:—(a) in *venation*: The origin of the second vein takes place at a considerable distance before the discal cross-vein, this distance being, however, shorter than the length of the discal cross-vein; this cross-vein is placed nearer to the middle of the discoidal cell. The basal angle of the second vein is rounded and without recurrent veinlet, or exceptionally only with a very short stump; the upper branch of the cubital fork is likewise rounded at base, and very rarely provided with a rudimentary stump. (b) In *pattern*: The brown spots on the cross-veins are broadened to form short bands, recalling the pattern of *S. trifasciatum*, Wiedemann. The costal cell is dark in its whole length; the base of the wing is brown right to the humeral cross-vein, ending in an oblique line extended from this cross-vein to the axillary incision; the abbreviated band below the origin of the third vein extends to the sixth, filling out the end of the second basal cell; sometimes the 2 basal cells and the base of the marginal cell are entirely filled with brown, thus reproducing the *Anthrax* wing pattern.

One ♀ specimen from Jackal's Water has the wings wholly hyaline, pale yellowish toward the base, and without any distinct dark pattern, except the grey praediscoidal spot; the discal cross-vein is placed much before the middle of the discoidal cell, as in *incisurale*, but the curvature of the base of the second vein and of the cubital fork are as in the type. I give a name to this interesting variation, namely var. *elutum*, var. nov.

*SPONGOSTYLUM INCISURALE*, Macquart (1840).

A common and variable species, distinguished by having only 2 or 3 dark spots on the wings.

Numerous specimens of both sexes, varying in length between 7 and 12 mm. Namaqualand, Spektakel and Springbok (Cape), October and November, 1890 (R. M. Lightfoot). Bushmanland, Jackal's Water, and Matjesfontein (Cape), same collector; Hex River (Cape), December, 1884 (L. Péringuey); M'Fongosi, Zululand, December, 1914 (W. E. Jones); O'Okiep (Cape), November, 1885 (L. Péringuey); Inhambane, Mozambique (K. H. Barnard).

SPONGOSTYLUM PUNCTIPENNE, Wiedemann (1821).

A robust species, easily recognisable by having 4 or 5 dark spots on the wings and by the broad tufts of black scales on the sides of the abdomen.

A single male specimen from Hex River (Cape), December, 1884 (L. Péringuey), rightly determined as *Argyramoeba punctipennis* by Bigot.

## SUBFAMILY EXOPROSOPINAE.

### VILLA, Lioy (1864).

This genus is rather abundant in South Africa. The species can be easily recognised from those of the following genus, chiefly on account of the *spinulose* front tibiae. Those in the collection can be distinguished as follows:

- 1 (12). Wings without broad dark markings, even if a little darkened at base or along the fore border.
- 2 (11). Wings entirely hyaline, even at the fore border, sometimes with blackish or yellowish extreme base; species of medium or of small size.
- 3 (8). Abdomen without tufts of black scales on the sides of the middle segments; face without black hairs; wings with pale yellowish base and with mainly yellow veins.
- 4 (7). Abdomen without distinct black tufts at the sides near the end base of wings in the male with broad patagia-like, silvery organs.
- 5 (6). Legs with fulvous femora; abdomen clothed with short hairs, even on the sides . . . . . *flavipes*, Loew.
- 6 (5). Legs with black femora; abdomen long-haired, chiefly on the sides. . . . . *albescens*, Loew.
- 7 (4). Abdomen with small tufts of black hairs at the sides of the 5th and 6th segments; wings of male destitute of silvery patagia; legs black, densely clothed with yellow scales . . . . . *sexfasciata*, Wied.
- 8 (3). Abdomen with dense tufts of long black scales at the sides of the middle segments; face with more or less abundant black hairs; femora broadly yellow at the base; wings with blackish base and black veins, and in the male with silvery basal patagia.

- 9 (10). Abdomen with white, non-shining scales and provided at the end with alternating white and black tufts . . . . . *vitripennis*, Lw.
- 10 (9). Abdomen with transverse bands of glittering silvery scales, and at the end entirely clothed with such scales . . . . . *argentina*, sp. n.
- 11 (2). Wings darkened at the base and along the costal cell; legs yellow; species of great size . . . . . *lasia*, Wied.
- 12 (1). Wings with a well-defined dark pattern, which fills up entirely the two basal cells; face white-haired; legs yellow *leucochila*, nom. nov.

VILLA FLAVIPES, Loew (1860).

A species of middle size with entirely hyaline wings, distinguished by the briefly haired abdomen and by the yellow femora. Female originally described from Caffraria, and not recorded subsequently. There is a male from Klipfontein, Namaqualand (Cape) (L. Péringuey). The hitherto undescribed male is like the female, but the frons at the vertex is only as broad as the ocellar tubercle; the eyes have the upper areolet a little enlarged; the wings have a broad silvery patagium and the basal comb is clothed with silvery scales.

VILLA ALBESCENS, Loew (1860).

Closely allied to the preceding, but at once distinguished by the black femora and by the long-haired abdomen.

Originally described from South Africa, but widely spread over the Ethiopian region. A male from Hex River (Cape), another male from Klipfontein, Namaqualand (Cape) (L. Péringuey).

VILLA SEXFASCIATA, Wiedemann (1821).

Allied to the preceding, but distinct owing to the small tufts of black hairs at the end of the abdomen and by the black legs, which, however, are densely clothed with yellow scales.

Described from South Africa and redescribed as *flavescens* by Loew; it is also widely spread. In the collection there is a female from Hex River (Cape), December, 1884 (L. Péringuey).

VILLA VITRIPENNIS, Loew (1860).

Dipteren-Fauna Süd-Afrikas, p. 217, pl. ii, fig. 18.

Distinguished from all the preceding species by the large tufts of black scales on the middle segments of the abdomen, and by the vitreous wings, which have a blackish base and black veins. Described

from South Africa, but widely spread. A male specimen from Barberton, Transvaal, December, 1911 (H. Edwards); a female from Hex River (Cape), January, 1883 (L. Péringuey); Otjivarongo (Damara-land), January, 1920 (R. W. E. Tucker).

*VILLA ARGENTINA*, sp. nov., ♂.

A very peculiar, small species, distinguished by the glittering silvery bands on the abdomen and at its apex.

Type ♂, a single specimen from Hex River, December, 1884 (L. Péringuey).

Length of body 8.5 mm.; of wing 7.5 mm. Head black; occiput tolerably shining, with abundant white scales near the middle of the eyes, with short dark hairs above and with greyish central fringe; post-vertical furrow narrow and deep, the ovate, prominent ocellar tubercle being placed just in front of it. Eyes dark brown, with the upper areolets a little enlarged, the indentation less developed, but the bisecting line very long; frons a little shining, about as broad at vertex as the ocellar tubercle, clothed with erect black hairs, and with scarce greyish cells near the eyes and on the frontal sides. Face rounded, not prominent, densely clothed with short black hairs and with abundant greyish scales. Antennae entirely black; the two first joints very short, of equal length, the first with black hairs; third joint with the basal discoidal part not longer but broader than the second joint, and the styliform part very thin, long, filiform, about as long as one and a half times the remainder, ending in a minute bristle. Mouth-opening narrow; genae linear; proboscis black, short, thick. Thorax and scutellum entirely black, faintly shining, finely punctulate; they have very minute, scattered, yellow scales and rather long whitish hairs in front and on the sides, these last whiter and forming a not well-indicated stripe; all the bristles are of a pale yellowish colour, those of the scutellum being darker. Pleurae grey-dusted, with whitish hairs, even on the metapleura; squamae dirty yellowish, with a brown border and glittering silvery fringe; halteres dark yellowish, with paler knob. Abdomen like the thorax, but narrowly red on the sides of the two first segments; the long hairs on the middle of the tergites are scattered, whitish near the base and blackish at end; the hairs of the sides are long, whitish on the 1st and 2nd, black and scaly on the 3rd, quite snow-white on the 4th, black and scaly on the 5th and 6th segments; the 7th segment is entirely clothed with long, silvery, glittering scales directed outwardly. On the base of the 2nd segment there is a narrow, less distinct band of

white scales; the 3rd and 4th segments have at the base a narrow band of long, glittering or bright scales interrupted in the middle. Venter black, with white scales and scattered white hairs; genitalia rather large, pendulous, set on the left side, reddish and brown, pale and dark-haired. Legs black, the femora broadly reddish at the base, the 4 anterior tibiae dark reddish; the scales are white, the hairs whitish, the spines black; front tibiae with distinct apicules; middle femora with 2 rather long, hind femora with 2 very short spines; hind tibiae with a sparse fringe of dark scales outwardly; claws black. Wings as in *vitripennis*, with a silvery patagium, but with entirely black basal comb; terminal loop of the second longitudinal vein much less indicated than usually, almost indistinct, and in consequence the upper branch of the cubital fork is less curved in the middle; discoidal cell more narrow; second posterior cell narrow and long, half as broad as the third. Alula long, pale yellowish grey, with a brown border and a broad greyish fringe; axillary lobe very short and broad.

VILLA LASIA, Wiedemann (1824).

A short-haired species of great size, with the wings infuscated at the base and along the costal cells.

Described from the Cape and recorded from South Africa by Fargeau, Serville and Walker. I am referring with doubt to the present species a couple of gigantic specimens from Bushmanland, Jackal's Water (Cape), October, 1911 (R. M. Lightfoot), measuring 15.5-17 mm. in length of body and only 12-13 mm. in length of wing, while Wiedemann gives only 5 lines. Frons of male as broad as the ocellar tubercle, that of the female twice as broad. Clothing of thorax entirely yellow, paler on the pleurae, bristles yellow. On the abdomen there are 5 transverse bands of yellowish scaly tomentum—at least in the male. Legs reddish with yellowish scales; femora and tibiae blackened at end, the tarsi likewise. Wings with typical venation, no silvery patagia in the male; basal comb very large with yellow scales; first posterior cell narrowed at end.

VILLA LEUCOCHILA, nom. nov. (for V. LEUCOSTOMA, Wied.).

Loew's Dipteren-Fauna Süd-Afrikas, Pl. ii, fig. 19.

Very distinct owing to the broad, brown markings of the wings, which fill the whole of the two basal cells.

Described in 1821 by Wiedemann from the Cape under the name of *leucostoma*. I change this name, because it is pre-occupied by Meigen,

1820. The species seems to be an exclusively South African one. There is in the collection a single male specimen from Kalk Bay (Cape). (R. M. Lightfoot).

OESTRANTHRAX, Bezzi (1912).

This very interesting genus was described by me in my paper on the African Bombyliidae of the British Museum for the type *Anthrax obesus*, Loew. The main characters of the genus are to be found in the broad and long facial plate, in the reduced mouth parts and in the absence of thoracical macrochaetae.

OESTRANTHRAX OBESUS, Loew, 1863.

A specimen from Cape Town, 1880. The species was described from South Africa, and some allied forms occur in other parts of the Ethiopian region.

SYNTHESIA, gen. nov.

I have to make a new genus for a species which shows a very strange combination of characters, connecting the Lomatiinae with the Exoprosopinae; it is aberrant like *Chiasmella*, but is closely allied to the preceding genus *Oestranthrax* as well as to the genus *Hemipenthes*. It may be defined as an Exoprosopine with 2 submarginal cells, with spinulose front tibiae, with bluntly convex face, with no developed macrochaetae, and with the second longitudinal vein originating before the middle cross-vein. In this last character the new genus *Synthesia* is drawing near to the Lomatiinae, while in the general conformation it is receding from them. It may be characterised as follows:

Body of oval shape, briefly pilose, not bristly at all. Head a little narrower than the thorax; occiput bilobate above, with a deep central cavity, and depressed between the eyes; central fringe complete, dense and short. Eyes separated in both the sexes, but the frons of the female always about twice as broad as that of the male; they are broadly indented at the hind border, but the bisecting line is less distinct. Ocellar tubercle rather prominent, elongate, with 3 equidistant ocelli. Frons quickly broadening in front beyond the middle; face bluntly convex, but very prominent; in a front view the face is narrowed beneath, and thus its broader line is to be found just below the root of antennae. Antennae set very widely apart from each other at base and inserted above the middle of the eyes; the 2 basal joints are very short; the third joint is elongate conical,



gradually tapering into a long joint, with a very short and thin apical style. Mouth-opening narrow and elongate; proboscis not at all projecting, shorter than the oral cavity, with not broad terminal labella; palpi long and thin, not much shorter than the proboscis and pilose. Thorax broad, not much convex above, without bristles, but at fore border and on sides above with dense tufts of bristly hairs; metapleurae hairy, while the surrounding parts are bare. Scutellum broad and semicircular, without distinct bristles at hind border. Squamulae with short, scaly fringe. Abdomen of oval shape, as broad as the thorax at base, acute behind in the male, obtuse in the female; male genitalia small, directed to the left side; spines of the ovipositor long, thin, curved. Legs with the front pair distinctly abbreviated; front tibiae with distinct spicules inside; front tarsi not specially pubescent; middle femora with 2 spines on the fore side on the apical half; hind femora with 3-4 short spines below on the apical half; 4 posterior tibiae with numerous and long spicules; pulvilli about as long as the claws, which are simple and curved. Wings rather broad and long, distinctly broader in the female; membrane smooth and very iridescent; they have no developed pattern, being only yellowish-fusca on the basal half. Basal hook very stout and curved; basal comb very short; 2nd longitudinal vein originating at right angle and before the middle cross-vein at a distance which is about as long as the cross-vein itself, deeply looped at end; 3rd vein placed on the same straight line with the praefurca, its upper branch strongly S-shaped and not retreating at base; 2 submarginal cells only present. Discoidal cell rather short, acute at base and obtuse at end; its terminal cross-vein short and only a little oblique outwardly; in the female it is broader than in the male; the middle cross-vein is placed near its middle, or a little before it. First posterior cell of about the same breadth throughout its whole length; second posterior cell rectangular, about as broad at end as the third, which is acute and prolonged basally; fourth posterior cell broader than all the others, its contact at base with the discoidal cell being longer than the inferior apical cross-vein of the second basal cell; anal cell broadly open at end. Axillary lobe broad; alula well developed and fringed with scales; ambient vein complete.

Type: The following new species.

*SYNTHESIA FUCOIDES*, sp. nov.

A yellowish pilose fly of a humble-bee appearance, not very different from some species of *Villa*, but at once distinguished from them on account of its well developed pulvilli.

Type ♂ and type ♀, a single couple of not well-preserved specimens from Namaqualand, Springbok, November, 1890 (R. M. Lightfoot).

♂, ♀. Length of the body 8·5–10 mm.; of the wing 8–9 mm. Head yellowish black at vertex and on the occiput; it is densely clothed with a short, yellowish, equal pubescence; on the sides of the occiput, near the eyes, the pubescence is more scaly and more yellow, and on frons and face it is more erect and of a more golden colour, chiefly on the lower part of the face. Antennae with the 2 basal joints red and the third black with a red base. Proboscis dark reddish above and black with yellowish hairs. Thorax black on the back, reddish on the humeral, calli, on the postalar calli and on the pleurae; it is densely clothed with a short, yellowish pubescence, which on the pleurae is longer and more erect, forming dense tufts on the propleurae, on the notopleural line, on the mesopleurae, and on the upper part of metapleurae. Scutellum reddish with a black base, clothed like the back of thorax. Halteres and squamulae whitish. Abdomen reddish, the segments from the 1st to the 4th with a broad, black, transverse basal band that does not reach the sides and decreases in size from the basal to the 4th segment; it is clothed with dense pale yellowish hairs which are longer and paler at the sides near the base; genitalia reddish yellow; spines of the ovipositor red; venter wholly reddish, with a narrow whitish hind border of the segments and with a short yellow pubescence. Legs entirely of a pale reddish-yellow colour from the coxae to the end of the tarsi, and clothed with a pale yellowish, scaly pubescence; spines and spicules black; pulvilli yellowish; claws red, with black tips. Wings hyaline, with the basal fore half infuscated to the end of the subcostal cell and to the base of the first submarginal, of the first posterior and of the discoidal cells; this infuscation is darker towards the middle, but is not sharply defined at the hind border. Veins reddish, with fuscous ends; ambient vein black; basal hook yellow; basal comb with black bristles, but clothed with a yellowish tomentum; axillary lobe hyaline; alula yellowish.

#### THYRIDANTHRAX, Osten Sacken (1886).

This genus is taken here in a wider sense for the reception of those species of *Anthrax* (*auctorum*) which have smooth front tibiae, rather long proboscis, conical and prominent third antennal joint and often a conical face. The wings have usually an extended pattern, but they may also be completely hyaline. The species are as follows:

- 1 (8). Apical cross-vein of the discoidal cell straight; head, antennae and palpi entirely black; discal cross-vein placed near the base of the discoidal cell, wings never fenestrate.
- 2 (5). Wings entirely hyaline, only narrowly yellowish or blackish at the base and in the subcostal cell.
- 3 (4). Wings with pale yellowish base; the attenuated part of the third antennal joint rather thick . . . . . *leucoproctus*, Loew.
- 4 (3). Wings with blackish base and blackish subcostal cell; styliiform part of the third antennal joint very thin . . . . . *linea*, Loew.
- 5 (2). Wings with a rather extended brown or blackish pattern, filling out the base of the second basal cell and the base of the anal cell.
- 6 (7). First posterior cell distinctly narrowed at end; discal cross-vein placed near the middle of the discoidal cell; third posterior cell long and with an acute base . . . . . *abruptus*, Loew.
- 7 (6). First posterior cell not narrowed at end; discal cross-vein near the base of the discoidal cell; third posterior cell shorter and with an obtuse base . . . . . *lugens*, Loew.
- 8 (1). Apical cross-vein of the discoidal cell S-shaped; head, antennae and palpi mainly or wholly yellow; discal cross-vein on or after the middle of the discoidal cell; wings fenestrate, viz. with hyaline spots on cross-veins and bifurcations.
- 9 (10). Two submarginal cells only, as usual; wings very broadly yellowish at base, the brown fenestrate pattern being reduced to a less defined, not broad band on the middle of the wing; species of small size and of a paler colour . . . . . *calochromatus*, sp. nov.
- 10 (9). Three submarginal cells; wings with more than the basal half filled with a brown extended pattern, and very narrowly or not at all yellowish at the base; species of large size and darker colour.  
*ternarius*, Bezzi.

THYRIDANTHRAX FLAMMIGER, Walker (1849).

Distinct by the conical face, the short third posterior cell, the infuscated costal cell and the middle cross-vein margined with fuscous.

Of this West African species of the group *qfer* there are 2 specimens from M'Fongosi, Zululand (W. E. Jones).

THYRIDANTHRAX LEUCOPROCTUS, Loew (1860).

A small species, distinct owing to its wholly hyaline wings, which are only a little pale yellowish near the base.

Originally described from the Cape, and not recorded subsequently.

A single female specimen from Klerksdorp, Transvaal, December, 1890.

In the first example the contact between the third posterior and the discoidal cell is rather straight and about twice as long as that

between the fourth posterior and the same cell ; the first posterior cell is not narrowed at end.

Another example from Salisbury, S. Rhodesia.

THYRIDANTHRAX LINEA, Loew (1860).

Allied to the preceding species, but easily distinguished by the wings being blackish at the base and along the subcostal cell. Originally described from Caffraria, but, as it seems, widely spread over the Ethiopian region. There are in the collection two female specimens on the same pin, without precise locality, and another from East London, Cape (R. M. Lightfoot).

THYRIDANTHRAX ABRUPTUS, Loew (1860).

Dipteren-Fauna Süd-Afrikas, p. 219, pl. ii, fig. 20.

A medium-sized species, distinguished by the broad blackish marking on the wings and by the different neurulation.

Rather widely spread over the Ethiopian region, and common in South Africa, from where it was originally described. In Northern Rhodesia this species has been bred from puparia of *Glossina morsitans*. There are numerous specimens of both sexes from M'Fongosi, Zululand, March, 1914 (W. E. Jones) ; from Hex River (Cape), January, 1886 (L. Péringuey) ; from Bushmanland, Jackal's Water (Cape), October, 1911 (R. M. Lightfoot) ; from Dunbrody, Uitenhage (Cape), March, 1912 (J. O'Neil) ; from O'Okiep, Namaqualand (Cape), October, 1895 (L. Péringuey).

In the present species the contact of the third posterior with the discoidal cell is strongly sinuous, and three or four times longer than that of the fourth in the same cell.

THYRIDANTHRAX TRANSIENS, Bezzi.

A small species closely allied to *abruptus*, but distinct by the more extended black pattern of wings, the base of the 4th posterior cell and more than the half of the anal cell being also blackened. Originally described in my work of the Bombyliidae of the British Museum from Nyassaland, there is a specimen from Salisbury, S. Rhodesia, 1917.

THYRIDANTHRAX LUGENS, Loew (1860).

Closely allied to the preceding, but distinguished by its smaller size, less intensive and somewhat different wing pattern, and a different neurulation, which agrees with that of *leucoproctus* and *linea*.

This South African species seems to be widely spread over the region; but can be easily mistaken for *abruptus* if attention is not given to the different venation; the distinctive character, the wing pattern, as established by Loew, is subject to some variation.

The species seems to be rarer than the preceding; in the collection there are only two specimens from the Hex River (Cape), November, 1882 (L. Péringuey), and from Klipfontein, Namaqualand (Cape), November, 1885, from the same collector.

The contact of the third posterior with the discoidal cell is almost straight and only a little longer than that of the fourth.

THYRIDANTHRAX CALOCHROMATUS, sp. nov., ♂.

An elegant species of the *fenestratus* group, distinguished by the very reduced dark markings of the wings and by the mainly yellow wing-veins.

Type ♂. A single specimen from the Cape, without precise locality, determined by Bigot as *Anthrax calochromatus* Big., but never published; the name is here retained. The species is closely allied to *T. macquarti*, Bezzi, but the wing pattern is more reduced, even more than in *T. elegans* or in *T. polyphemus*.

Length of body 9 mm.; of wing 9 mm.; of wing spread 20 mm. Head black, with the anterior part of the frons and the whole face of a yellowish red colour. Occiput moderately shiny, with scarce greyish hairs above and with white scales at the eye borders; central fringe pale yellowish; postvertical furrow less marked. Eyes with the upper areolets not distinctly enlarged, the indentation faintly pronounced and the bisecting line very short and less distinct. Frons at vertex twice and more as broad as the less prominent, brownish-coloured ocellar tubercle; it is clothed with black hairs, which become pale yellowish on the red part, and with whitish scales; face with white hairs on the sides and near the eyes and in the middle with whitish scales; it is rather conical in shape. Antennae with the two basal joints yellow, the first with whitish hairs and above with a few black ones; third joint wanting in the type. Genae rather broad, black front, yellow behind like the mouth borders; proboscis black, as long as the mouth, with a yellow basal ring, palpi yellow- and whitish-haired. Thorax black, rather shining, with sparse yellow scales and with rather long yellowish hairs in front and on the sides; bristles

yellowish; pleurae black, grey-dusted, reddish along the sutures, with whitish hairs and with white scales; metapleural tuft whitish. Scutellum red, narrowly black at the base, with yellowish scales and yellow bristles at the hind border. Squamae yellowish with white fringe; halteres yellow with whitish knob. Abdomen red, with the first segment black and with a broad median black spot on the second, a smaller one on the 3rd and a very small one on the 4th; it is clothed with pale yellowish scales, but on the apical half of the 2nd and on the base of the 5th segment the scales are black; it seems that the *perspicillaris*-pattern is white and well developed; the hairs of the sides are whitish and long near the base, whitish and short on the remainder, but there are no black hairs. Venter red with black base, white scales and whitish hairs; genitalia red, small, asymmetrically placed. Legs black, with yellow trochanters, tibiae and base of tarsi; the femora are only narrowly yellow at end, their scales are whitish and the scarce hairs are whitish like those of the coxae; spines black, middle femora with one very long one, hind femora with six rather short; front tibiae smooth, the others with rather long and numerous spicules; front tarsi very short, slenderly pilose, with very small claws; claws black. Wings whitish hyaline, with a broad pale yellowish base and a brown, fenestrate, median band; the brown band is thus reduced to some dark spots on the sides of the three fenestrae and to an ovate spot near the middle of the anal cell; second basal cell almost entirely yellowish; veins yellow, only a little darkened at the end; basal comb with black bristles, but densely clothed with yellow scales; alula pale yellowish, with whitish fringe; axillary lobe short and broad, greyish hyaline. Second longitudinal vein very short, with a well-developed terminal loop; discal cross-vein long and oblique, placed at about the middle of the discoidal cell; first posterior cell narrowed at the end; discoidal cell narrow, very acute outwards, its apical cross-vein 5-shaped and placed parallel to the hind border of the wing; third posterior cell very long, its contact with the discoidal cell more than ten times as long as that of the fourth posterior with the same cell; strongly looped at the base; anal cell rather broadly open; second basal cell as long as the discoidal cell and at end broader than the cell. Upper branch of the cubital fork regularly curved in the middle, rather flat at the base and without appendix.

THYRIDANTHRAX TERNARIUS, Bezzi.

Distinguished from all its congeneric species here described by the regular presence of 3 submarginal cells, and by the very extended dark pattern of the wings.

This species is widely spread over all the Ethiopian region, and will be described by me in a paper on the Bombyliidae of the British Museum. Notwithstanding the 3 submarginal cells it cannot be placed in *Exoprosopa* owing to the different shape of the third antennal joint; in general pattern and colouring it is similar to the species of the *fenestratus*-group, to which it belongs undoubtedly. I suspect that the *Anthrax caffer* of Wiedemann, placed in *Exoprosopa* by the authors, may be the same as the present species.

A female specimen from Bushmanland, Jackal's Water (Cape) (R. M. Lightfoot); another female from Barberton, Transvaal, April, 1911 (H. Edwards); and a third female from Klipfontein, Namaqualand (Cape), November, 1885 (L. Péringuey), labelled by Bigot as *Anthrax pyrrproctus*—a name, however, which has never been published.

THYRIDANTHRAX LAETUS, Loew (1860).

Closely allied to *T. ternarius*, but distinguished by the wholly reddish legs and by the distinctly infuscated end of the discoidal cell. A female specimen from Damaraland, Narugas, January, 1919 (R. M. Lightfoot); Otjivarongo, January, 1920 (R. W. E. Tucker).

LITORRHYNCHUS, Macquart (1840).

Of this typical and very numerous Ethiopian genus there are in the collection only a few species, which may be distinguished as follows:

- 1 (2). Squamae black and black fringed; anal cell narrowly hyaline at end; species of large size, measuring 16–18 mm. in length. *maurus*, Thunb.
- 2 (1). Squamae pale brown or yellowish, with yellowish or white fringe; anal cell more broadly hyaline at end; species of smaller size, only 10–13 mm. in length.
- 3 (4). Marginal cell hyaline at end . . . . . *tollini*, Loew.
- 4 (3). Marginal cell filled out with brown to the end, and even a little beyond . . . . . *argyrolepis*, Bezzi.

LITORRHYNCHUS MAURUS, Thunberg.

Nov. Act. Ups., ix, p. 73, 1827, pl. i, fig. 11.

A species of great size, with a fringe of bright red hairs in front and on the sides of thorax.

Originally described from the Cape by Thunberg as *Tanyglossa*, it

was referred erroneously by Macquart to *Anthrax collaris*, Wied., which is an Indian species, and was described by Loew under the name of *Exoprosopa rostrata*. It seems to be exclusively a South African species, and not at all rare. It ranges from Cape Town to Rhodesia. There is a female specimen from the Transvaal, Barberton, April, 1911 (H. Edwards), in which the anal cell is more broadly hyaline than usual.

LITORRHYNCHUS TOLLINI, Loew (1863).

A species smaller and paler coloured than the preceding one, and usually with a hyaline spot in the middle of the first posterior cell. Dr. Péringuey has bred this species from the mud nest of the ubiquitous wasp *Scelifrons quartinae*, together with the large Ichneumon, *Osprynchotus capensis*, and a Mutillid, *Dolichomutilla sycorax*.

LITORRHYNCHUS ARGYROLEPIS, Bezzi (1912).

Easily distinguished on account of its characteristic wing pattern, with the middle dark band narrowed at end.

Originally described from Nyassaland, there is in the collection a specimen from Potchefstroom, Transvaal (T. Ayres), also from Salisbury (S. Rhodesia) (D. Dods.); Bulawayo (S. Rhodesia) (R. W. E. Tucker).

EXOPROSOPA, Macquart (1840).

This very large genus has been divided by me into a number of subgenera. Those represented in the South African Fauna may be distinguished as follows:

- 1 (4). Discoidal cell before the end below with a strong projecting angle and there provided with an appendage; its terminal vein more or less sinuous, and placed at an angle to the longitudinal axis of the wing.
- 2 (3). Five posterior cells, the fourth being closed and stalked. *Metapenta*, Bezzi, n.
- 3 (2). Only four posterior cells, all open as usual. *Acrodisca*, Bezzi, n.
- 4 (1). Discoidal cell without such a projecting angle; if sometimes dilated, the projection is a rounded one and destitute of appendage.
- 5 (6). The vein between the discoidal and the second posterior cell is long, strongly sinuous, and runs in the same direction as the longitudinal axis of the wing. *Defilippia*, Liroy.
- 6 (5). The above-named vein is short, straight or only slightly sinuous, and placed at an angle or even perpendicularly to the longitudinal axis of the wing. *Exoprosopa*, s. str.



SUBGEN. METAPENTA.

This group is an exclusively Ethiopian one, and the species it includes are chiefly confined to the South; in the present collection there are two species.

EXOPROSOPA (METAPENTA) PENTALA, Macquart (1840).

Closely allied to *reticulata*, Loew, but distinct by the red scutellum and the red legs.

A female specimen from Dunbrody, Uitenhage (Cape); (J. A. O'Neil), February, 1912. Macquart has described the female from the Cape, but the figure of the wing is very misleading; and the species has nothing to do with the Mediterranean *varinerius-pygmalian*, Fabr., which is the type of my new subgenus *Mesoclis*.

The species is very like *M. reticulata*, but is paler; the frons is entirely black, but the face and the first antennal joint are red; thorax with the pleura mostly yellow haired, the metapleural tuft with only a few black bristles; scutellum red with black base. Abdomen black, with the sides of the 2nd and 3rd segment more or less broadly red, or even red with median black spots. Legs entirely red, but tarsi darkened and femora partly black-scaled; front tibiae thin and smooth. Wing pattern and venation as in *reticulata*.

EXOPROSOPA (METAPENTA) CORVINA, Loew (1860).

Near *E. pentala*, but distinguished by the quite black legs and metapleural tuft, and by the almost entirely black wings.

A female specimen from Damaraland, Grootfontein, December, 1918 (R. M. Lightfoot); Otjivarongo, January, 1920 (R. W. E. Tucker).

SUBGEN. ACRODISCA, nov.

This subgenus is also an exclusively Ethiopian one, and the South African species belong nearly all to one of the two groups in which it is divided, viz. the group characterised by the very short or even rudimentary antennal style, and by the shape of the discoidal cell at end, which is almost equal to that noticeable in *Litorrhynchus*.

The species in the collection may be distinguished as follows:

- 1 (4). Wings uniformly infuscated, not broadly hyaline at the apex, never at the hind border.
- 2 (3). Metapleural tuft wholly or for the greater part black; antennal style rudimentary; species of smaller size . . . *fimbriatella*, sp. nov.

- 3 (2). Metapleural tuft entirely yellowish; antennal style well developed, but short and stout; species of greater size . . . *offusata*, sp. nov.
- 4 (1). Wings with a dark base and a dark fore border, but hyaline in the remainder, with distinct spots or reticulation.
- 5 (6). The veins at the hind border of the wings are provided with fuscous confluent borders; anal cell entirely infuscated . . . *personata*, sp. nov.
- 6 (5). The veins of the hind border with isolated dark spots; anal cell hyaline at end, with a dark spot before the end . . . *angulata*, Loew.

EXOPROSOPA (ACRODISCA) FIMBRIATELLA, sp. nov., ♀.

A black species of small size, prevalently black-haired, with entirely fuscous wings and with rudimentary antennal style.

Type ♀, a single specimen from Potchefstroom, Transvaal (T. Ayres). The species seems to be closely allied to *umbrosa*, Loew, but is distinguished by the different antennae and by the different shape of the discoidal cell.

Length of body 8-8.5 mm.; of a wing 8.5-9 mm. Occiput black, with pale yellowish central fringe and yellowish scales at the eye borders; postvertical furrow narrow; eyes with faint indentation and a short bisecting line; ocellar tubercle flat and of brownish colour; frons entirely black, rather narrow, with black erect hairs and pale yellowish scales in front; face conical and much prominent, entirely black, clothed, like the frons, with a black tuft on the upper edge; mouth borders yellowish. Antennae with the first joint red, black-haired; the second half as long as the first and black; the third elongate, linear, black, obtuse at end, with a very minute, rudimentary style situated at its upper corner. Proboscis black, as long as the mouth; palpi black, with pale hairs. Thorax entirely black, with black hairs and black scales, and with a stripe of yellowish hairs on the sides; the collar is yellow above, black on the sides and below; the macrochaetae are well developed and black; pleura black-haired, with only a tuft of yellow hairs on upper border of the mesopleura; metapleural tuft entirely black; sternopleura reddish above. Squamae blackish brown, with a dark fringe; halteres black, with paler knob. Scutellum red, with black base, black scales and black bristles. Abdomen black, narrowly reddish on the sides of the 2nd and 3rd segment; it is clothed for the greater part by black scales, but the base of the second segment has a narrow complete band of white scales; sides of other segment with some white scales and with yellow scales at the hind border. First segment clothed with erect yellowish hairs, which form a characteristic complete fringe; all the sides,

except those of the first segment, with black short hairs and black scales; spines of ovipositor dark reddish; venter black, with yellow scales and black hairs. Legs entirely black, with black hairs and partly black, partly yellowish scales on the femora; front pair less abbreviated than in the allied species, with the tibiae rather slender and with minute, less distinct spicules; the tarsi rather long and with the usual pubescence; bristles black and long, 2 on middle femora and a complete row on hind femora; claws black, with acute tooth. Wings entirely and equally blackened, with black basal hook and black basal comb; the black clouds at the usual places are very faintly indicated; praediscoidal spot whitish, small; alula narrow, blackened, with a long, dark brown fringe, like the base of the axillary lobe. Venation typical for the group; discal cross-vein before the middle of the discoidal cell, the second longitudinal vein originating before it; first posterior cell a little broader than the anal cell; second posterior cell a little broader than the third, the vein between them bent forwards; third posterior cell a little shorter than the fourth. Apical cross-vein of the discoidal cell very strongly S-shaped, and placed horizontally, the discoidal cell being as in *Litorrhynchus* very narrow and elongate.

*EXOPROSOPA (ACRODISCA) OFFUSCATA*, sp. nov., ♂, ♀.

Allied to the preceding, but of greater size and with yellow legs and with entirely yellowish-haired metapleurae. Some specimens from Matjesfontein (Cape), November, 1910; Laingsburg (Cape), November, 1910; Springbok, November, 1890; Spektakel, Namaqualand (Cape), October, 1890 (R. M. Lightfoot); O'Okiep, Namaqualand (L. Péringuey), October, 1885, labelled by Bigot "*Exoprosopa melania*," Big.—a name which has never been published. Length of body 12–13 mm.; of a wing 14–16 mm.; of wing spread 31–35 mm. Occiput black, with whitish central fringe and yellowish scales which are whitish below the indentation at the eye borders; ocellar tubercle very small and flat, black; frons of about equal breadth in both sexes, shining black, red above the antennae, clothed with black erect hairs and with whitish scales; face conical, very prominent, red, with a more or less broad black spot in the middle underneath, clothed like the frons and with a dense black tuft at the upper mouth edge; mouth borders yellowish. Antennae with the first joint red and black-haired; second joint much shorter, globular, dark reddish; third joint black, elongate, conical, gradually tapering in a rather thin point with a very short and stout style. Proboscis black, as long as the mouth;

palpi black, dark haired. Thorax black, with reddish postalar calli; it is clothed on the back with black hairs and yellowish scales, and shows a stripe of whitish hairs on each side; the macrochaetae are well developed, black; collar with yellow hairs above and below, Pleurae grey-dusted, reddish below, with yellow hairs and some black ones on the middle of the mesopleura and a few black bristles on the pteropleura; metapleura entirely yellowish-haired; sternopleura with a patch of silvery scales. Scutellum red, with black and black-scaled base, with yellowish scales behind and on the sides, and with black bristles. Squamae brownish black, with yellowish or whitish fringe; plumula whitish; halteres black with paler knob. Abdomen elongate, with parallel sides, obtuse at the end, flattened, black, with less developed red spots on the sides of the 2nd and 3rd segment. The middle and the base of the segments are clothed with black scales, while those of the hind border are yellowish; in addition, on the base of 2nd segment and on sides of 3rd and 4th there are bands of whitish scales; the sides have short black hairs, only those of the 2 first segments being whitish. Male genitalia black, yellow-haired; spines of the ovipositor long, straight, black; venter either entirely red, or with more or less developed basal black bands on the segments, clothed with white scales, and with white hairs at base, black at end. Legs yellow, the tarsi and the hind tibiae being infuscate at apex; those of the front pair are much abbreviated, coxae with whitish hairs at the base and with black ones at the end, the tibiae are very thick and short, with well developed spicules, the tarsi are very short, with short black pubescence; femora with yellowish scales; spines black; on the front pair are some short ones, on the middle pair 3-4, on the hind pair a complete row; claws black, with long acute tooth. Wings long and broad, but narrow at base, the alula being small; the basal hook and the small comb are black; the latter is clothed with yellow scales. Wings wholly and equally blackened, with faint violaceous reflexions and less distinct pale spots in the centre of the discoidal, submarginal and posterior cells, which in some specimens are more distinct than in others, making the wings appear reticulate. There are no distinct darker clouds at the usual places. The alula is entirely black and with blackish long fringe, even on the base of the axillary lobe. Venation normal for the group; discal cross-vein placed before the middle of the discoidal cell; apical cross-vein of the discoidal cell very V-shaped and placed horizontally, the cell therefore shaped as in *Litorrhynchus*; first posterior cell a little broader than the anal cell, second only a little narrower than the third, third very long. Praediscoidal spot small and greyish.

EXOPROSOPA (ACRODISCA) PERSONATA, sp. nov., ♂, ♀.

A small black species allied to *angulata*, but distinguished by the more broadly infusate wings, which are reticulate and not spotted along the hind border.

Type ♂, and an additional specimen of the same sex from Bushmanland, Jackal's Water (Cape), October, 1911 (R. M. Lightfoot).

Type ♀, a single specimen from Tulbagh (Cape), November, 1910 (R. M. Lightfoot).

Length of body 7-9 mm.; of a wing 8-10 mm.; the ♀ is of greater size, measuring 11 and 12 mm. respectively.

Head as in the preceding species, but the frons and face is entirely black in the male and red in the female, with broad black base and spot; basal joints of the antennae blackish in the male and red in the female, the third joint black, conical, elongate, obtuse at apex, with a very short and stout style. Thorax entirely black, clothed like the preceding, but with the lateral hairs more white; scutellum black, with red hind border, broader in the female. Squamae and halteres as in the preceding. Abdomen entirely black or with very small red spots on the sides of 2nd segment in the female; it is clothed with black scales on the middle and base of the segments, and with yellowish ones on the sides and hind border. On the base of the 2nd segment there is a narrow transverse band of whitish scales and another abbreviated one on the sides of 3rd; the sides have whitish hairs on the two basal segments, black intermingled with black scales on the remainder. Male genitalia black; spines of the ovipositor black, thin and straight. Venter entirely black in the male, with broad, red hind borders on the segments in the female, clothed with white scales and with pale hairs. Legs dark reddish, with black hind tibiae and tarsi; front coxae with whitish hairs and femora with whitish scales; front pair very abbreviated, with the tibiae short and stout and with less developed spicules, and with the tarsi very short and thick, shortly pubescent; middle femora with 2-3, hind femora with 3-4 spines in the male and a complete row in the female; claws black, with long acute tooth. Wings as in the preceding species, with more developed clear spots in the cells, even in the discal; the apex is quite hyaline, but all the veins at hind border and the cross-vein of the discoidal cell have broad, partly confluent dark borders, making the wing appear as if reticulate; anal cell darkened to the end; praediscoidal spot small, whitish. The basal hook is black; the comb is small, black, with whitish or yellowish scales; alula black, with long, blackish fringe extended on the base of the axillary lobe. Venation as in the preceding, but the first posterior cell is usually a little more broadly open.

## EXOPROSOPA (ACRODISCA) ANGULATA, Loew (1860).

Dipteren-Fauna Süd-Afrikas, p. 242, pl. ii, fig. 39.

Distinct from all the preceding species on account of the rounded dark spots before the ends of the veins along the hind border of the wings.

Originally described from the Cape from a female example, and subsequently recorded from Cape Town by Miss Ricardo, there is in the collection a male from Bushmanland, Een Riet (Cape), October, 1911 (R. M. Lightfoot).

The hitherto undescribed male is very like the female and has the frons of about the same breadth; the genitalia are red, yellowish-haired. In this species the claws are black, with reddish base, and have an acute tooth; the front legs are of the usual structure, the tibiae being provided with well-developed spicules and the tarsi being pubescent.

## SUBGEN. DEFILIPPIA, Lioy (1864).

The species of the present subgenus are rather numerous in the Ethiopian fauna; they are recognised chiefly on account of the shape of the discoidal cell and of its terminal vein, and have usually a much developed wing pattern; but the distinction from some species of *Exoprosopa* s. str. is not always easy. Of the various groups of species belonging here, only two seem to be represented in South Africa, viz. the *venosa*-group, which is the more important, and the *grandis*-group.

The species in the collection may be distinguished as follows:

- 1 (10). Second longitudinal vein with a double, deep, truncate loop; at end marginal cross-vein strongly curved, and much retreating; smaller species, with narrow, much variegated or wholly infuscated wings.
- 2 (3). Wings petiolate, equally darkened, without clearer parts at end or at hind border, but with distinct darker spots on cross-veins and bifurcations; fourth vein with some isolated, darker, rounded spots.  
*neurospila*, sp. nov.
- 3 (2). Wings not distinctly petiolate, and with clear apex and clear hind margin, reticulate or spotted; fourth vein never with isolated dark spots in the centre.
- 4 (7). The veins at end and at hind margin of wings have broad fuscous borders (wings reticulate).
- 5 (6). Base of antennae, scutellum, sides of abdomen and legs reddish-yellow; pleura with predominant yellowish hairs; wings less darkened . . . . . *venosa*, Wied.
- 6 (5). Antennae, scutellum, abdomen and legs entirely black; pleurae wholly black-haired; wings more blackened . . . *nigrovenosa*, Bezzi.

- 7 (4). Wings spotted, viz. at apex and at hind border with fuscous spots, which are sometimes partly confluent.
- 8 (9). Scutellum black; third antennal joint short, broad at base and quickly attenuated in a short styliform part, which bears a style as long as the joint itself; hind border of the veins with black spots before their ends . . . . . *maculosa*, Wied.
- 9 (8). Scutellum red; third antennal joint elongate conical, with a very short terminal style; veins of the hind border in part destitute of spots . . . . . *maculifera*, sp. nov.
- 10 (1). Second vein at end with simple, flat, acute loop; marginal cross-vein less curved and less retreating; species more robust, with broad-banded wings.
- 11 (12). Hind tibiae densely fringed on the outer side; occiput red; middle band of wings simple and reaching the hind border; apex of wing not spotted . . . . . *strenua*, Loew.
- 12 (11). Hind tibiae with the usual row of spines; occiput black; middle band of wings divided into two parts posteriorly, but reaching the hind border; apex of wing spotted . . . . . *hirtipes*, Loew.

EXOPROSOPA (DEFILIPPIA) NEUROSPILA, sp. nov., ♂.

A narrow, elongate species with long, equally infuscated, black-spotted wings bearing spots along the fourth longitudinal vein.

Type ♂, a single specimen from M'Fongosi, Zululand, February, 1914 (W. E. Jones).

Length of body 10 mm. Occiput black, with yellowish scales and whitish central fringe; postvertical furrow narrow and not broadened behind; eyes with deep indentation and long bisecting line; ocellar tubercle reddish brown; frons deep black, narrow at vertex but very broad at the insertion of the antennae, with rather long black erect hairs and yellowish scales; face conically prominent, red, with a black spot on each side, with pale yellowish scales, yellow hairs on sides, and a fringe of black hairs at the mouth borders, forming a dense tuft at the end; mouth borders pale yellowish. Antennae with the two basal joints red, black haired, the first more than twice as long as the globular second joint; third joint wanting in the type. Proboscis black, a little projecting; palpi dark yellowish, pale-haired. Thorax deep black, the postalar cells a little reddish, clothed with short black hairs and with golden yellow scales, with a narrow stripe of yellow hairs on each side and with well-developed black bristles; collar entirely yellow; pleurae black, grey-dusted, red along the sutures and behind, with wholly yellow hairs; metapleural tuft yellow; sternopleura with yellow hairs and yellow scales. Scutellum red with black base, clothed like the thorax. Squamae dirty yellowish, with whitish fringe; plumula yellow; halteres pale brownish, with a lighter knob.

Abdomen narrow and elongate, with parallel sides, red, the first segment and a broad middle longitudinal stripe black; it is clothed with black and yellow scales, and on the sides has short hairs which are pale yellowish on the first and the fore part of the second and third segments, black on the rest. Genitalia red and black, yellow-haired; venter pale red, with whitish scales and long pale yellowish hairs at the base and in the centre. Legs yellow, the coxae and tarsi black at tip; they are clothed with yellow and black scales, and have black bristles; coxae with yellow hairs; front pair less abbreviated, with smooth tibiae; middle femora with 1-2, hind femora with 4-5 spines; claws black, with a short tooth. Wings rather broad, uniformly but not intensively infuscated; the rounded dark spots are placed on the base of the upper branch of the cubital fork, on the discal cross-vein, on the base of second longitudinal vein, on the root of the fifth vein, on the fourth vein in the centre of the segment between the root of the fifth and discal cross-veins, on the upper exterior angle of the discoidal cell, before the apex of the fourth vein, on the extreme inner base of the 2nd and 3rd posterior cells and on the base of the 4th posterior cell. Hook black; comb narrow, reddish, with black bristles; veins dark red, darkened outwardly; alula short, transverse, rounded, with dark fringe. Second vein with very deep double loop at end; marginal cross-vein **S**-shaped and much retreating; upper branch of cubital fork much retreating; discal cross-vein placed on the middle of the long and very acute discoidal cell. First posterior cell broadly open, second long and narrower than the third at end, its basal vein strongly **V**-shaped, but shorter than the basal vein of the third cell, which is strongly bent basally; third posterior cell very long, but considerably shorter than the 4th at the base; anal cell broadly open; axillary lobe rather broad and long.

*EXOPROSOPA (DEFILIPPIA) VENOSA*, Wiedemann (1819).

Easily distinguishable by the wings being hyaline but strongly reticulate in their apical and posterior part.

This exclusively South African species is represented by a male specimen from Cape Town, December, 1884 (T. D. Butler).

*EXOPROSOPA (DEFILIPPIA) NIGROVENOSA*, Bezzi, sp. nov.

Allied to the preceding, but entirely black and with black-haired pleurae.

Described in my general work; there is a female from Durban, April, 1913 (W. Haygarth). The present species is possibly the same as *E. venosa*, Macquart, nec Wiedemann.



*EXOPROSOPA (DEFILIPPIA) MACULOSA*, Wiedemann (1819).

Distinguished by the very characteristic form of the third antennal joint, and by the numerous dark spots of the apical and posterior part of the wings. Likewise an exclusively South African form, of which there is a female from Cape Town, 1884, and a male from Tulbagh (Cape), November, 1910 (R. M. Lightfoot).

*EXOPROSOPA (DEFILIPPIA) MACULIFERA*, sp. nov., ♀.

Allied to the preceding, but distinguished by the elongate conical third antennal joint, and by the much less numerous dark spots on wings.

Type ♀, a single specimen from the Cape, without precise locality.

Length of body 10 mm.; of a wing 10 mm. Occiput black, grey-dusted, with whitish scales near the eyes; postvertical furrow narrow, not dilated behind; eyes with deep indentation; ocellar tubercle brownish; frons narrow, black, rather shining, with black erect hairs, and yellowish scales. Face much conically prominent, entirely red, clothed like the frons and with a dense black tuft at the upper edge of the mouth; mouth borders pale yellowish. Antennae with the first joint red, black-haired; the second brown, globular; the third black, narrow at base, almost linear, less acute at end, with a short style, which is much shorter than the half of the joint. Proboscis black, a little projecting; palpi thin, blackish, pale-haired. Thorax black, with the humeral and postalar knobs reddish, clothed with black hairs, yellow scales and yellowish hairs on each side; macrochaetae black; collar pale yellowish; pleurae grey-dusted, broadly reddish at the sutures, with yellowish hairs and some black ones in the centre of the mesopleura and black bristles on the pteropleura; metapleural tuft entirely yellow; sternopleura with white scales and yellow hairs.

Scutellum red, clothed like the thorax with black hairs at the hind border. Squamae yellowish, with whitish fringe; plumula white; halteres brown with whitish knob. Abdomen black, rather broadly red on the sides of all the segments, except the first; it is clothed with black and yellowish scales, which form some biarcuate bands, like those of *E. reticulata*, on the segments 2-6. Base of 2nd and sides of 3rd segment with broad, pale yellowish band; sides of first, fore border of 2nd and 3rd segment with whitish hairs, the rest with short black ones. Spines of ovipositor yellow. Venter entirely red, with whitish scales and whitish hairs. Legs entirely yellow, with

whitish scales, only the tarsi blackened at end; front pair with the coxae clothed with long whitish hairs and some black bristles; it is moderately abbreviated; the tibiae are thin and smooth and the tarsi minutely pubescent; spines of femora black, long, the middle pair with 2, the hind pair with 5; claws red, with black tip, and short but acute basal tooth. Wings with a black basal hook and narrow, reddish, black bristly comb; alula greyish, narrow, transverse, with dark fringe. The venation is the same as in *maculosa*, but the marginal cross-vein shows a stump in the first submarginal cell before its upper end.

The markings are the same, but much less dark and more restricted, the discoidal cell being almost entirely hyaline, and the spots at apex being narrower and more separated; moreover, along the hind margin the dark spots at the end of 4th and 5th vein are completely wanting, the one at the end of the vein between the 2nd and 3rd posterior cells is very faint, and even the spot at the end of the anal cell is less developed. The apical cross-vein of the discoidal cell is not entirely margined with fuscous, but has only two rounded spots at the two ends.

EXOPROSOPA (DEFILIPPIA) STRENUA, Loew (1860).

A beautiful species of great size, very distinct from any other here recorded on account of its red occiput and of the broad, oblique median dark band of the wings.

Originally described from a female example from the Cape and never recorded subsequently. Dunbrody, Uitenhage (Cape), 1899 (J. A. O'Neil).

To the good original description the following may be added: Postvertical furrow narrow, but bilobate behind; the indentation of eyes is flat but the bisecting line is long; vertex less separated from the occiput, with no distinct space or furrow; the borders of the occipital cavity are black; even the third antennal joint is reddish; proboscis black, little projecting; palpi dark yellowish, pale-haired. Mesopleura on middle with black, bristly hairs; sternopleura with yellow hairs; metapleural tuft entirely yellow. Squamae brownish red, with double fringe, blackish above and yellowish below. Spines of the ovipositor shining red. Front legs much abbreviated, the tibiae being short and thick, smooth, and the tarsi stout, finely pubescent; middle femora with 5-6, hind femora with a complete row of spines; hind tibiae with a dense outer fringe of short, black, bristly hairs among which the discal spines are concealed; claws black, with a short but acute tooth. Alula transverse but rounded,

yellowish, with dark fringe; basal hook black, long, gently curved; comb very broad, reddish, yellow-tomentose, with short black bristles. Marginal cross-vein less retreating; discoidal cell very acute outwardly, but its terminal vein considerably shorter than the vein at the base of the third posterior cell; second basal cell broader at end than the discoidal one; axillary lobe very broad and short; anal cell narrowly open.

EXOPROSOPA (DEFILIPPIA) HIRTIPES, Loew (1860).

Dipteren-Fauna Süd-Afrikas i, p. 233, pl. ii, fig. 32, 1860.

A very distinct species on account of its peculiar and rich wing pattern, and the only species here recorded having the second basal cell broadly hyaline.

Not rare in South Africa and found also northward on the East Coast. The ciliate front tarsi are present only in the female. There is a couple of specimens from Dunbrody, Uitenhage (Cape), March, 1903 (J. A. O'Neil).

SUBGEN. PTEROBATES, Bezzi.

This subgenus is easily recognised from all the other subgenera of *Exoprosopa*, s. lat., on account of its broadly feathered hind legs and of its very peculiar wing pattern.

EXOPROSOPA (PTEROBATES) APICALIS, Wiedemann (1821).

Of this old and well-known species there is a specimen from Dunbrody, Cape Colony, 1908 (J. A. O'Neil).

SUBGEN. EXOPROSOPA, sensu stricto.

The species of the present subgenus are very numerous, and not always easy to distinguish from those of the preceding one, especially those with an extended wing pattern. They may be divided in some groups, which at present must be considered as artificial ones, but help in the determination, as can be seen from the following table:

- 1 (40). Wings not wholly hyaline, but with a more or less extended and defined dark pattern.
- 2 (3). Wing-pattern filling up the entire black wing, only the extreme apex being whitish and hyaline (*nemesis*-group) . . . *nemesis*, Fabr.

- 3 (2). Hyaline part of the wings extended as much as, or even more than, the darkened part.
- 4 (27). Wings typically dimidiate, viz. obliquely bordered with fuscous on the anterior half, the posterior one being hyaline with or without dark spots or abbreviated bands.
- 5 (14). Fore dark border of wings with abbreviated bands or projections departing from it and encroaching on the posterior hyaline part, but always without isolated dark spots or infuscations of cross-veins (*seniculus*-group).
- 6 (13). The middle fuscous band of wings is prolonged over the discoidal cell, reaching sometimes the hind border or nearly so.
- 7 (12). The vein between the discoidal and the second posterior cell is long, placed horizontally, nearly V-shaped as in *Dejilippia*.
- 8 (11). Discoidal cell very much dilated at end and with a projecting stump; metapleural tuft mainly black; second posterior cell narrower than the third at end.
- 9 (10). Wing-markings black; middle band rather broad . . . *morosa*, Loew.
- 10 (9). Wing-markings pale brown; middle band very narrow. . . . *ignava*, Loew.
- 11 (8). Discoidal cell not, or less dilated at end and not appendiculate; metapleural tuft yellow; second posterior cell not narrowed at end. . . . *seniculus*, Wied.
- 12 (7). The above-named vein is short and almost straight; discoidal cell not or little dilated at end and not appendiculate; metapleural tuft yellow . . . . . *elongata*, Bic.
- 13 (6). Middle band rudimentary, reduced to a short projection not reaching beyond the middle of the discoidal cell; this last cell narrow and truncate at end . . . . . *argentifrons*, Macq.
- 14 (5). Fore dark border of the wings destitute of dark bands or projections proceeding from it; if abbreviated bands are present there are also isolated fuscous spots.
- 15 (22). Wings with distinct isolated dark spots on hind border of apex, even if existing only as a faint infuscation at the upper end of the discoidal cell or the inner end of the second posterior cell.
- 16 (17). Wings with some isolated brown spots in the hyaline apex; terminal vein of discoidal cell short and perpendicular; antennal style rudimentary (*capensis*-group) . . . . . *capensis*, Wied.
- 17 (16). Wings without isolated dark spots on the hyaline apex, but with a spot on the hind hyaline part (wanting in *dux*); discoidal cell never dilated at end (*heros*-group).
- 18 (19). Legs entirely black . . . . . *cluta*, Loew.
- 19 (18). Legs red, at least those of the front pair.
- 20 (21). Wings with a broad, distinct, greyish patch at the lower angle of discoidal cell . . . . . *heros*, Wied.
- 21 (20). Wings without such a patch . . . . . *dux*, Wied.
- 22 (15). Wings simply dimidiate, without isolated spots at the apex or at the hind border (*dimidiata*-group).
- 23 (24). The vein between the discoidal and the second posterior cell in a long and strongly V shape . . . . . *sigmoidea*, Bezzi.

- 24 (23). The above-named vein short and straight.
- 25 (26). Metapleural tuft entirely reddish; discoidal cell not dilated at end; basal joints of antennae black; abdomen of male with silvery lateral patches . . . . . *dimidiata*, Macq.
- 26 (25). Metapleural tuft entirely black; discoidal cell dilated at end and appendiculate; antennae red at base; abdomen not silvery.  
*dilatata*, sp. nov.
- 27 (4). Wings not properly dimidiate, even if the costa is infuscated or striped.
- 28 (37). Abdomen of conical shape, pointed at end, very often red; terminal vein of discoidal cell short, straight, but placed obliquely, and therefore the upper angle of discoidal cell is an acute one (*punctulata*-group).
- 29 (30). Front tibiae distinctly spinulose; wings with a brown fore-border and with dark spots on cross-veins and bifurcations.  
*punctulata*, Macq.
- 30 (29). Front tibiae smooth; wings without such a pattern.
- 31 (34). Wings with a broad brown fore border.
- 32 (33). Dark fore border less intensive and less defined, extending to the 2nd basal cell and on a part of the discoidal cell . . . *parvula*, nom. nov.
- 33 (32). Brown fore border well defined, not extending to the discoidal cell or 2nd basal cell . . . . . *stannusi*, Bezzi.
- 34 (31). Wings with a narrow, yellowish, or brownish fore-border.
- 35 (36). Basal joints of antennae and legs entirely black; cross-veins infuscated, abdomen red on the sides . . . . . *inaequalipes*, Loew.
- 36 (35). Basal joints of antennae and legs red; cross-veins less infuscated; abdomen broadly or wholly red . . . . . *batrachoides*, Bezzi.
- 37 (28). Abdomen not conical and mainly black; terminal vein of discoidal cell straight and perpendicular, its upper angle therefore not acute, the cell being truncate outwardly.
- 38 (39). Wings with broad and well-defined black spots on cross-veins and bifurcations (*balioptera*-group) . . . . . *balioptera*, Loew.
- 39 (38). Wings not punctate, or only with less defined shading on the cross-veins (*busris*-group) . . . . . *luteicosta*, Bezzi.
- 40 (1). Wings entirely hyaline, without any distinct dark pattern (*stupidula*-group) . . . . . *parvicellula*, sp. nov.

#### A. GROUP PUSILLA.

This small group, which is made distinct by the presence of hyaline fenestrae in the dark part of the wings, included only the West African species *pusilla*, Macq., and *jacchoides*, Bezzi. A third South African species is now added to it.

#### EXOPROSOPA (EXOPROSOPA) FORMOSULA, sp. nov.

An elegant species very distinct from all the other South African species of the present subgenus on account of its hyaline fenestrae in the black part of the wings.

Type ♂, a single specimen from Hex River; December, 1884 (L. Péringuey).

♂. Length of the body 7 mm.; of the wing 7 mm.; of the wing-spread 16 mm. Head entirely shining black, but dark reddish brown on the face below and at the hind border of the occiput; the mouth borders are narrowly yellowish. The occiput is denuded in case of the type, but the central fringe is blackish, and at the borders of the eyes, chiefly near the indentation, there is a silvery, scaly tomentum. Frons at vertex as broad as the ocellar tubercle, but quickly broadening beyond the middle; it is clothed with black erect hairs and has short, scattered, silvery hairs on the front half. Face conically produced but blunt, clothed with black hairs and with some silvery, shorter ones. The two basal joints of the antennae are black, the first being clothed with black hairs; the third joint is dark reddish, shortly conical, about as long as the first joint, with a short terminal style. Proboscis as long as the mouth opening, dirty blackish; palpi thin, upturned, dark yellowish. Thorax entirely black, and (when denuded) rather shiny; humeral and post-alar callosities brownish like the greatest part of the pleurae; on the back of the mesonotum there are black hairs and brownish tomentum; the collar is black; the pleurae have black and dark yellowish hairs; all the macrochaetae are black. Scutellum dark brown with a black base, clothed like the back of mesonotum. Squamulae brown with white fringe; plumula white; halteres yellowish. Abdomen shining black, with the segments narrowly brown at hind border; it seems to be clothed with black hairs, and with brownish, scaly tomentum, but at the base, on each side of the two first segments, there is a spot of white scales, clothed with white hairs; the last two segments also seem to have silvery scales at the base. Venter black, with silvery scaly tomentum; genitalia reddish-brown. Legs black, with reddish brown tibiae and tarsi; front pair abbreviated, with smooth tibiae; spines black; claws simple, reddish yellow, with black tips. Wings proportionately short and broad, with a very distinct pattern. At base they are dark yellowish brown to the base of the discoidal cell; an elongate, deep black spot on the second basal cell is very striking, and is placed symmetrically across the basal portion of the fourth longitudinal vein. In the middle the wings are black, the edge going obliquely and sinuously from the end of the auxiliary vein to the end of the anal cell; the discoidal cell is filled up with black to the end, only its upper corner being narrowly hyaline; in the marginal cell the black ends rather obliquely and a little before the upper end of the marginal cross-vein. The apical part of the wings is hyaline and strongly

iridescent. The 2 whitish hyaline fenestrae are rounded and are placed one at the base of the 2nd longitudinal vein and one on the middle cross-vein; they are of about equal size; at the base of the 3rd and of the 4th posterior cell there are less-developed yellowish stripes; at the end of the anal cell there is in addition a rounded, yellowish spot. Basal hook and basal comb black, the latter with a dark greyish tomentum above; veins quite reddish yellow and paler on the hyaline parts of the wing; 2nd longitudinal vein less looped at end and not retreating, originating before the middle cross-vein; marginal cross-vein oblique; upper branch of the cubital fork S-shaped. First posterior cell dilated outwardly, as broad as the 2nd; 3rd broadly truncate at base; 4th broader than the 3rd at end; discoidal cell narrowed in the middle, with the middle cross-vein placed before the centre, and with the terminal cross-vein straight, but set obliquely; anal cell broadly open. Alula yellowish-brown, with a darkish fringe like the base of auxiliary lobe, which is black on its apical half only.

## B. GROUP NEMESIS.

EXOPROSOPA (EXOPROSOPA) NEMESIS, Fabricius (1805).

Syst. Antl., 1805, p. 121.

A very distinct species, characterised by the entirely black wings, with a narrow whitish hyaline apex and some shining brownish spots at cross-veins and bifucations.

A specimen from M'Fongosi, Zululand, 1914 (W. E. Jones), and another from Barberton, Transvaal, December, 1911 (H. Edwards).

## C. GROUP SENICULUS.

EXOPROSOPA (EXOPROSOPA) MOROSA, Loew (1860).

Dipteren-Fauna Süd-Afrikas, p. 332, pl. ii, fig. 30.

A very characteristic species of great size, distinguished by the abbreviated cross-band of the wings at the end of discoidal cell. Originally described from Caffraria, it is probable that *Littorhynchus hamatus*, Macquart, from the Cape is the present species, chiefly because the length of the proboscis seems to be variable, as observed by Miss Ricardo for the following species. There is a female specimen from Barberton, Transvaal, December, 1911 (H. Edwards).

EXOPROSOPA (EXOPROSOPA) IGNAVA, Loew.

Dipteren-Fauna Süd-Afrikas, p. 232, pl. ii, fig. 31.

Closely allied to the preceding, but distinguished on account of its much paler and less extended wing pattern.

Originally described from the Cape and recorded subsequently from the Transvaal; I have received a specimen from Grahamstown (Cape).

EXOPROSOPA (EXOPROSOPA) SENICULUS, Wiedemann (1828).

If I have interpreted exactly the present species it seems to be a common insect in South Africa, as previously stated by Macquart (who placed it in *Litorrhynchus*); it is easily distinguishable by the ascribed characters given in the table. Some specimens from Van Wyk's Vlei, Carnarvon (Cape) (E. G. Alston), and from Smithfield (Orange Free State) (D. R. Kannemeyer).

EXOPROSOPA (EXOPROSOPA) ELONGATA, Ricardo (1901).

A distinct, middle-sized species, closely allied to the preceding one, but easily recognised by the venation. Originally described from the Transvaal and Namaqualand (Cape), there are in the Museum collection specimens from Howick, Natal, and from M'Fongosi, Zululand, March, 1911 (W. E. Jones).

EXOPROSOPA (EXOPROSOPA) ARGENTIFRONS, Macquart (1855).

Dipt. Exot. Suppl., 5, p. 65, pl. iii, fig. 2.

A pretty species of small size; very distinct from all the others owing to the short, black projection of the fore border of the wings and by the silvery frontal patch.

Described from the Cape and subsequently recorded by me from Western Nyassa; there is a single male specimen from Cape Town (L. Péringuey).

#### D. GROUP CAPENSIS.

EXOPROSOPA (EXOPROSOPA) CAPENSIS, Wiedemann (1821).

A small-sized, rather aberrant species, distinguished by the rudimentary antennal style, by the spinulose front tibiae and by the characteristic wing pattern.



Wiedemann has described this species from the Cape; it is recorded only by the oldest authors. The species described under the same name by Macquart seems to be a different one, as the antennal style is said to be distinct, but Wiedemann states that the third joint is thicker than usual.

There is in the collection a single specimen from O'Okiep, Namaqualand (Cape) (L. Péringuey), 1905.

Third antennal joint  $1\frac{1}{2}$  times as long as the two preceding together, elongate conical, rather linear, not broadened at base and without distinct terminal style. Face conically produced, with dense pale yellowish scales; proboscis not projecting. Thorax with black bristles; pleurae with only yellowish hairs, even on the metapleura; sternopleura with yellowish scales. Scutellum red, with black base and black bristles at the hind border. Squamae pale yellowish, with whitish fringe. Legs entirely yellowish, with whitish scales; front pair much abbreviated, with the tibiae thick and short and beset with distinct spicules, the tarsi shortly pubescent; claws thin, with reddish base and short but acute basal tooth. Wings with small, yellowish or whitish tomentose basal comb; second vein originating at a considerable distance from the discal cross-vein, with not deep but duplicated terminal loop; marginal cross-vein V-shaped, much retreating; first posterior cell narrowed at end, only a little broader than the anal cell; discal cross-vein placed in the middle of the discoidal cell, which is not dilated below at end and has a V-shaped terminal vein, which is, however, less obliquely set; third posterior cell considerably shorter than the fourth at the base. Axillary lobe long and narrow; alula infuscated, and with a darkish fringe.

#### E. GROUP HEROS.

The species of the present group are often confused, and seem to be peculiar to the South African Fauna; they are closely allied in venation with some species of the following group, but have a much less defined and less dark wing pattern; characteristic also of the group are the isolated dark spots on the hind half of the wing, which are rarely wanting.

#### EXOPROSOPA (EXOPROSOPA) INFUMATA, Bezzi.

Closely allied with *eluta*, but at once distinguished by its sharply defined wing-pattern and by the posterior half of the wing being distinctly smoky.

Originally described by me from N.W. Rhodesia in my paper on the Bombyliidae of the British Museum, there is a specimen from Salisbury, Arcturus, 1916 (Dr. Melle).

*EXOPROSOPA (EXOPROSOPA) ELUTA*, Loew (1860).

Dipteren-Fauna Süd-Afrikas, p. 227, pl. ii, fig. 5.

Very closely allied to the following one, but distinguished by the smaller size, by the black legs and by the faint infuscation on the cross-vein dividing the discoidal from the second basal cell.

Stellenbosch (Cape), 1888 (L. Péringuey); Ceres (Cape), Matroosberg, 5000 ft., January, 1917 (R. M. Lightfoot); another example 9 mm. in length from Zululand, M'Fongosi, December, 1914 (W. E. Jones).

*EXOPROSOPA (EXOPROSOPA) HEROS*, Wiedemann (1819).

A species of great or medium size, distinguished by the broad fuscous patch of the hind half of the wings.

I think that the form described by Loew (Dipt. Sudafrik. p. 334, pl. ii, fig. 33) answers to the variety mentioned by Wiedemann, and I have named it *loewiana*; I think, moreover, that *E. caffra*, Macquart (*nec* Wiedemann) is also the present species, which seems to be very common in South Africa.

There are numerous specimens, varying in length from 10 to 20 mm. Stellenbosch (Cape), 1887 (L. Péringuey); Berg River; Iaingsburg, November, 1910 (R. M. Lightfoot); Hex River, January, 1885, named "*heros*" by Bigot; O'Okiep (Cape), 1885 (L. Péringuey); Barberton, Transvaal, November, 1911 (H. Edwards); Spektakel and Springbok, Namaqualand (Cape), November, 1890 (R. M. Lightfoot); M'Fongosi, Zululand, December, 1911 (W. E. Jones); Otjivarango, Damaraland, January, 1920 (R. W. E. Tucker).

*EXOPROSOPA (EXOPROSOPA) DUX*, Wiedemann (1828).

Probably only a variety of the preceding, distinguished by the want of the fuscous patch at the hind half of the wing.

Some specimens from Hex River (Cape), December, 1884 (L. Péringuey), and Bushmanland, Henkries (Cape), October, 1911 (R. M. Lightfoot).

F. GROUP DIMIDIATA.

EXOPROSOPA (EXOPROSOPA) SIGMOIDEA, Bezzi (1912).

This species has the venation of *heros*, but without the lower dilatation of the discoidal cell, and the wing pattern as in *dux*, but more intensive and more defined.

Originally described from Western Nyassaland. There are some specimens from Smithfield, 1910, Orange Free State (D. R. Kanne-meyer), and from Dunbrody, Uitenhage (Cape), March, 1912 (J. A. O'Neil).

EXOPROSOPA (EXOPROSOPA) DIMIDIATA, Macquart (1846).

Dipt. Exot. Suppl. i, p. 107, pl. ix, fig. 11.

A species very distinct on account of its wing pattern and of the silvery abdominal pubescence of the male.

Widely spread in South Africa. There are specimens from Natal, Pine Town, 1885 (J. H. Barber), named "*Anthrax dimidiatus*, Macq.," by Bigot; Bechuanaland, junction Crocodile-Marico Rivers, February, 1918 (R. W. E. Tucker); Otjituo, Damaraland, January, 1920 (R. W. E. Tucker).

EXOPROSOPA (EXOPROSOPA) DILATATA, sp. nov., ♂.

A species of large size, distinguished by the prevailing black colour of the thoracical hairs and by the dilatation of the discoidal cell.

This characteristic species seems to be common in South Africa; it is almost certain that the female described by Loew (*l. c.*, p. 226), and which I have previously referred with doubt to my *discriminata*, is the same species. There are in the collection numerous specimens from M'Fongosi, Zululand, February, 1912 (W. E. Jones); Barberton, Transvaal, December, 1911 (H. Edwards); Smithfield, Orange Free State (D. R. Kannemeyer); Dunbrody, Uitenhage (Cape), 1899 (J. A. O'Neil). I have also received it from Grahamstown.

Length of the body 14-16 mm.; of a wing 14-16 mm. Head black, dark reddish on fore half of frons and on the face, genae and mouth borders; occiput dark grey-dusted, with yellowish central fringe, yellowish ocular stripe, and a deep postvertical furrow; vertex separated from the occiput by a deep depression; eye indentation less pronounced, but bisecting line elongate; frons at vertex more than three times as broad as the dark brown ocellar tubercle, with short,

deep black erect hairs and with golden yellow scales on the reddish part; face conically prominent, with yellow scales and black oral fringe. Antennae with the first joint long, red, black-haired; the second joint globular, reddish brown; the third black, shortly conical, not longer than the first two joints taken together, not broadened at base, its terminal style longer than the half of the joint. Palpi and proboscis black, this last projecting for the length of the labelli. Thorax entirely black, with black hairs and golden yellow tomentum on dorsum; there are no distinct clear stripes on the sides; collar bright yellow above, black on sides and underneath. Notopleural tufts and bristles black; pleurae black-haired, with some golden hairs on upper border of mesopleura and pteropleura; metapleural tuft entirely black; sternopleurae without clear tomentum; scutellum dark reddish, with black base, yellowish hairs and black bristles at the hind border. Squamae dark brown or blackish, with blackish fringe; plumula white; halteres blackish. Abdomen black, narrowly reddish on the sides of the second segment; the dense but not long hairs of the sides are entirely black, except on the sides of the first segment, where they are pale yellowish; tergites clothed with black scales and with a complete band of quite white scales on the base of the 3rd segment, narrow in the middle and broadened towards the sides; on the 6th and 7th segments there is such a band, but it is broadly interrupted in the middle, thus forming 4 ovate spots; genitalia black and black-haired; venter entirely black, with black hairs and scarce scattered whitish scales. Legs with the coxae entirely dark reddish, only the tarsi being blackened; front pair less abbreviated, with smooth tibiae and shortly pubescent tarsi; middle femora with 2-3 hind femora with a complete row of spines; claws black, with a short and acute basal tooth. Wings purely hyaline, with a well-defined, blackish basal pattern; the limit goes regularly from end of the axillary vein, over discal and anal cross-veins, to the middle of the axillary lobe; praediscoidal spot of great size, rounded, greyish. The basal hook is black; the comb is black, broad and short, with reddish dust. Terminal loop of the second longitudinal vein less deep; marginal cross-vein retreating, but almost straight; first posterior cell less narrowed at end, second narrower than the third and the vein between them is curved forwards at end; third posterior cell less short than the fourth at base; discal cross-vein set a little before the middle of the discoidal cell; this cell rather short, broad; the vein dividing it from the third posterior cell is curved below and protrudes in this last cell; the vein between the discoidal and the second posterior cell rather Y-shaped and long; there is a stump in the discoidal cell near

the end of the vein dividing the second from the third posterior cell; axillary lobe short and broad; alula very darkened, with a blackish fringe which is continued on the basal part of the axillary lobe.

#### G. GROUP PUNCTULATA.

EXOPROSOPA (EXOPROSOPA) PUNCTULATA, Macquart (1840).

Dipt. Exot. II, p. 48, pl. xviii, fig. 2.

An eminently characteristic species, distinct from all its allies on account of the spinulose front tibiae.

Widely spread over the Ethiopian region. Dunbrody, Blue Cliff, Uitenhage (Cape), March 1st, 1912; Cape Town (R. M. Lightfoot), March, 1917; Klipfontein, Namaqualand (Cape), L. Péringuey; MFongosi (Zululand), W. E. Jones.

EXOPROSOPA (EXOPROSOPA) PERPULCHRA, Bezzi.

Distinct from the other species of the group on account of its rich wing pattern, consisting of 2 broad fuscous bands, crossing the wing at the two ends of the discoidal cell.

Originally described from Nyassaland, and not hitherto known from South Africa; there is a specimen from Salisbury, S. Rhodesia, January, 1915 (J. O'Neil).

EXOPROSOPA (EXOPROSOPA) PARVULA, Bez., nom. nov.

*E. parva*, Ricardo (1901), not *parva*, Loew (1869).

Evidently allied to the preceding species, but distinguished by the dark wing pattern, which is destitute of isolated spots, recalling that of the *dimidiata* group.

Originally described from the Transvaal, there is a specimen from Kimberley (Cape) 1892 (L. Péringuey).

A male specimen from Pretoria, Transvaal, November 10th, 1916 (G. A. H. Bedford), has the frons a little broader, the femora black, and the wing pattern more infuscated. In the right wing of this specimen the discoidal cell is exactly divided into two cells by a supernumerary cross-vein, placed in the middle.

EXOPROSOPA (EXOPROSOPA) STANNUSI, Bezzi (1912).

Easily distinguished by its well-defined dark fore border of wings, the second basal cell being, however, almost entirely hyaline. Origin-

ally described from Western Nyassa; female specimens from Bulawayo and Umaruma, S. Rhodesia, October 2nd, 1916 (J. A. O'Neil).

In my original description the scutellum is said to be black, while it is red. The hitherto undescribed female is very much like the male; the spines of the ovipositor are of a shining red colour.

*EXOPROSOPA (EXOPROSOPA) INAEQUALIPES*, Loew (1852).

A robust species of large size, distinguished from the one following by the entirely black antennae and legs, and by the broadly infuscated cross-veins.

Described by Loew from Mozambique, there is a female specimen also from Inhambane (Mozambique) December 7th, 1912 (K. H. Barnard).

This species is closely allied to *E. major*, Ricardo, from Nyassaland, but is distinguished by the redder abdomen. *E. costalis*, Macquart, belongs also to the present group of species very difficult to identify.

*EXOPROSOPA (EXOPROSOPA) BATRACHOIDES*, Bezzi (1912).

A species of great size, distinguished by the prevailing red colour of the legs and abdomen.

Originally described from Nyassaland, there are in the collection 2 specimens from Springvale, S. Rhodesia, October 6th, 1912, and also another from S. Rhodesia without exact locality (Oakley), 1910.

The present species seems to be hardly distinguishable from the West African *E. merope*, Wied.

## H. GROUP BALIOPTERA.

*EXOPROSOPA (EXOPROSOPA) BALIOPTERA*, Loew (1860).

Dipteren-Fauna Süd-Afrikas, p. 238, pl. ii, fig. 36.

A black, rather small species, at once distinguishable from any other by its characteristic wing pattern.

Described from the Cape and Caffraria; two examples from the neighbourhood of Durban, Natal (H. W. Bell-Marley), and Durban (Natal), without precise locality.

## I. GROUP INERMIS.

*EXOPROSOPA (EXOPROSOPA) PEDIFORMIS*, Bezzi.

Very distinct from all the other South African species on account of its reddish body, lacking all the macrochaetae, of its rounded face, of its non-spinous femora, and of its specially shaped discoidal cell in the yellowish grey wings.

Originally described from Nyassaland in my work on the Bombyliidae of the British Museum, there is a male specimen from M'Fongosi, Zululand, March, 1917 (W. E. Jones).

## J. GROUP BUSIRIS.

### EXOPROSOPA (EXOPROSOPA) LUTEICOSTA, Bezzi, sp. nov.

A species resembling in general facies *E. heros* or *dux*, but more allied to *major-batrachoides*, and having the venation of the present group, in which it may be provisionally placed.

A male from Ovamboland, 1890-91 (E. W. Eriksson), and 2 specimens from Grahamstown (Cape) in my collection; there are some other doubtful specimens from Touws River, Cape, and Potchefstroom, Transvaal (T. Ayres).

I described the present species from East Africa, and the South African specimens agree well with the types, but they are of larger size and have more extended and darker wing-pattern. *E. costalis*, Macquart, is perhaps allied, but it is said to have a venation like that of *E. Robertsi*.

Length of body 16-19 mm.; of wing 17-20 mm. Head black; the fore half of frons, the face and the mouth borders are of a pale reddish colour; occiput grey-dusted, with pale yellowish central fringe and whitish ocular stripe; postvertical furrow narrow; vertex depressed between the eyes; frons  $\frac{1}{5}$  of the head at vertex and  $\frac{1}{3}$  at the antennae, the upper half clothed with blackish erect hairs, the frontal half with dense yellowish scales and pale yellowish hairs; face bluntly convex, not much produced, the sides with shining white scales and whitish hairs at the mouth borders. Antennae with the first joint short, dark brown, yellowish-haired; third joint black, elongate, with a short terminal style; palpi and proboscis blackish, the latter a little projecting. Thorax black, with yellowish dust on the back, which shows 3 longitudinal stripes; collar entirely yellowish like the hairs on the sides; bristles black; pleurae entirely whitish-haired, even on the metapleura. Scutellum red, with a narrow black base, yellowish-dusted, and with numerous black bristles at the hind border. Squamae brownish yellow with a whitish fringe; halteres brownish, with paler knob. Abdomen broad and obtuse at end, entirely black; the hairs on the sides of the first segment whitish, those on the others alternately blackish and yellowish; the upper side is clothed with black scales and has cross-bands of white scales complete on the 2nd sides of the 3rd and 4th and also entire on the 6th and 7th; venter black, with white scales and hairs. Legs black, with yellowish scales on femora

and tibiae; front coxae yellowish-haired; front pair not much abbreviated, with smooth tibiae and short pubescent tarsi; claws black, with an acute basal tooth. Wings greyish hyaline with a narrowly luteous base, and a dark luteous fore border to the end of the axillary vein not extending below over the 4th longitudinal vein; cross-veins bordered with fuscous; basal hook reddish brown; basal comb reddish, with black bristles and yellowish dust. Second longitudinal vein with an almost indistinct terminal loop; marginal cross-vein straight and almost perpendicular; 1st posterior cell less narrowed at end, being more than twice as broad as the anal cell at end; 2nd much shorter and narrower than the third, this last considerably shorter than the 4th at the base. Discal cross-vein placed considerably before the middle of the discoidal cell; this last cell short and as broad at the base as at the end, very truncate outwardly, its terminal vein being perfectly straight, short and perpendicular, one third the length of the other vein. Alula yellowish, with greyish fringe; axillary lobe rather broad, but elongate.

#### L. GROUP STUPIDA.

EXOPROSOPA (EXOPROSOPA) PARVICELLULA, sp. nov., ♀.

A smallish species very like *stupida*, with metallic scales on head and body, but distinguishable by the wings being less vitreous and having a different venation.

Type ♀. A single not well-preserved specimen from Inhambane, Mozambique (K. H. Barnard).

Length of body 8 mm.; of a wing 7 mm. Head entirely shining black, with only the entire mouth borders and the genae yellow; occiput entirely clothed with metallic shining scales, which are denser near the rather deep indentation of eyes and on the lower part of the eye-borders; central fringe whitish; postvertical furrow deep, broadening behind; frons gently convex,  $\frac{1}{5}$  of the head at the vertex, with black, erect hairs and metallic scales in front above the antennae. Face conically prominent, but convex above and obtuse at end, with dense metallic scales and short black hairs. Antennae entirely black; first joint short and black-haired; third broad at base, but quickly constricted into a long and thick styliform part without distinct style at end; palpi and proboscis black, this last a little projecting. Thorax entirely black; it seems to be clothed with metallic scales which are denser near the sides; collar entirely whitish, like the longer hairs of the sides; bristles black, pleurae with entirely white hairs, even the meta-pleural tuft; sternopleura densely clothed by broad white scales.



Scutellum wholly black, with metallic scales like the thorax. Squamae whitish, with white fringe; halteres yellow; plumula white. Abdomen elongate-conical, entirely black, only the hind borders of the segments being a little brownish; the sides are entirely bare, the first segment only having short white hairs, and the last segment dark scales on the hind border; at the base of the 2nd, 3rd and 4th segment there seem to be bands of white scales, which are broadly interrupted in the centre; spines of the ovipositor black. Venter black, with complete bands of white scales at the base; last sternite prominent, in the shape of a short keel. Legs black; front pair wanting in the type, but the front coxae are black, white-tomentose and white-pilose; middle femora without distinct spines, hind femora with 2-3 at the end, underneath; spicules of tibiae scarce and short; claws black, with a short but distinct basal tooth. Wings hyaline, iridescent, with a pale yellowish tint; basal comb narrow, yellowish; veins entirely yellow, darkened near the apex and the hind border; second vein deeply looped at end; marginal cross-vein straight, but placed much obliquely; upper branch of third vein strongly retreating at base; first posterior cell not narrowed at the end, 2nd and 3rd of the same breadth at the end, the vein between them long and almost straight; 3rd shorter than the 4th at the base. Discal cross-vein set much before the middle of the discoidal cell, which is narrow, long and acute outwardly, its terminal vein being oblique; the basal angle of the vein dividing it from the 3rd posterior cell is provided with a stump projecting into the discoidal cell. Anal cell very broadly open at end; alula hyaline, with a short white fringe; axillary lobe short, but not very broad.

#### HYPERALONIA, Rondani (1863).

For a long time it was believed that in South Africa there were no representative of this genus, as pointed out in 1886 by Osten Sacken, who, however, has overlooked the fact that *Exopr. nigripennis* Loew, from Mozambique, belongs to the present genus. In 1901 Miss G. Ricardo referred to this genus *Anthrax rufa*, of Wiedemann, a species, however, which, from the description, is more probably a *Lomatia*. The genus is certainly poorly represented in the South African fauna, and in the collection there are only 2 examples belonging to 2 species, both belonging to the group of *H. nigripennis*, as shown in the following table:

- 1 (4). Head black; basal joints of the antennae black and black-haired; wings equally infusate, with not distinctly infuscated cross-veins and with the discoidal cell acute at base.

- 2 (3). Antennal style about as long as the third antennal joint; hairs on the sides of the thorax and abdomen of a golden yellow colour; femora black, clothed with dense yellow scales. *nigripennis*, Loew.
- 3 (2). Antennal style very short, rudimentary; hairs of the sides of thorax and abdomen bright red; femora red like the tibiae. *coleoptrata*, sp. nov.
- 4 (1). Head red; basal joints of antennae red and with reddish hairs below; wings dark-brownish, with distinctly infuscated cross-veins, and with the discoidal cell truncate at base. *vittata*, Ric.

HYPERALONIA COLEOPTRATA, sp. nov., ♂.

A middle-sized species with wholly black wings, closely allied to *nigripennis*, but distinguishable by the different antennae and by the bright red hairs on the sides of body.

Type ♂, a single specimen from Stella Bay, Natal, January, 1915 (H. W. Bell-Marley). The present species cannot be considered as identical with *A. rufa*, Wiedemann, because this author states that the wing venation and the antennae are as in *Lomatia belsebut*, and because the species is not placed in the 'Erste Horde,' pl. iii, fig. 1, which contains the Hyperaloninae, a subfamily very well interpreted by this early writer. Length of body 11 mm.; of wing 11 mm. Head black, dark reddish-brown in the lower part; occiput with yellowish central fringe, with narrow and simple postvertical furrow and with yellowish tomentose postocular stripe; eyes with a broad but not deep indentation and with a long bisecting line; frons at vertex a little more than three times as broad as the short, rounded, reddish ocellar tubercle, and having short and dense erect, black hairs and reddish-yellow scales in front. Face distinctly conical but not much produced, with reddish scales, black short hairs in the centre at the upper mouth-edge and reddish hairs on the sides underneath. Antennae short, the first joint black with deep, black, short hairs; the second globular, red, black-haired; the third black, shortly conical, as long as the two first joints taken together, with a very short and stout terminal style; proboscis black, thick, shorter than the mouth; palpi yellow, pale-haired. Thorax elongate, rather narrow, entirely black, clothed on the upper side with dense black hairs and black scales, but with reddish hairs in front of the scutellum; collar and notopleural tuft entirely bright red; supra-alar stripe reddish; macrochaetae strong and long, black; pleurae grey-dusted, with scattered black hairs and reddish tomentum on the sternopleura; metapleural tuft bright red. Scutellum dark red, with a black, black-scaled base, clothed with reddish dust and bearing black bristles behind. Squamae reddish brown, with reddish yellow fringe; plumula reddish, halteres yellowish, with

whitish knob. Abdomen elongate-conical, not broader than the thorax, obtuse behind, black, with a red stripe on each side from the 2nd segment to the end, the 7th segment being red with a black basal median spot; on the back it is clothed with black scales, with reddish scales on the base of the 2nd and on the whole of the 6th and 7th segments, but on the red stripes the scales are also red; hairs of the sides long and red on the 1st and 2nd segments, shorter and with intermingled black hairs on the remainder. Male genitalia red and reddish-haired; venter entirely red, with reddish hairs and reddish dust. Legs red, with reddish scales and black spines; coxae, end of the front tibiae and all the tarsi, except at the base, blackish; front pair abbreviated, with smooth tibiae and with the tarsi rather bare above; front coxae with reddish hairs; middle femora with 2-3, hind femora with a complete row of bristles; claws black, with an indistinct basal tooth. Wings short and rather broad, entirely and equally infusate from the base to the end, and with a vivid metallic sheen; the hook and the small comb are of a deep black colour; praediscoidal spot almost indistinct. Veins black; the loop of the 2nd longitudinal vein is simple but deep; submarginal cross-vein very short, straight, perpendicular; the cell, characteristic of the genus *Hyperalonia*, is twice as long as broad; the first posterior cell is not much narrowed at end, the 2nd is narrower than the 3rd at the end, the vein between them being S-shaped and bent forwards at the end; third obtuse at the base, but only a little shorter than the 4th. Discoidal cell narrow, irregular, acute at both ends, its terminal vein horizontal, V-shaped, as long as the equally V-shaped preceding vein; discal cross-vein set in the centre of the discoidal cell, the upper vein after it, strongly curved outwardly; anal cell narrowly open; axillary lobe rather narrow; alula black, with dark fringe.

*HYPERALONIA VITTATA*, Ricardo (1901).

A mainly reddish species, very distinct on account of its reddish brown and dark spotted wings, which are beyond the discoidal cell strongly truncate at the base.

Originally described from Nyassaland and widely spread over East Africa, there is a single male specimen from Salisbury (S. Rhodesia) June, 1913. This example has all the general characters of this species, but differs in two points: (1) There is a black spot on the occiput, surrounding the postvertical furrow; (2) the 2nd posterior cell of the wings is rather constricted at end. Owing to these two characters the specimen makes a passage to the form which I have described from East Africa under the name of *H. paris*.

## ADDITIONS.

## I.

The following South African species of Bombycidae are from the South-West Protectorate (Damaraland), the dipterous fauna of which is as yet very little known.

## SYSTOECHUS, Loew.

## SYSTOECHUS CTENOPTERUS, Mikn.

A female specimen from S.W. Protectorate, Grootfontein, January, 1920 (R. W. E. Tucker).

## EURYCARENUS, Loew.

The three South African species may be tabulated as follows:

- 1 (4). First posterior cell with a rather long stalk at end; abdominal segments destitute of silvery tomentum on hind border.
- 2 (3). Tarsi and tibiae yellowish, the hind tibiae with silvery scales; abdomen with a white longitudinal stripe in the middle; species of large size . . . . . *laticeps*, Loew.
- 3 (2). Tarsi and tibiae quite black, those of the hind pair with black scales; abdomen without white middle stripe; species of smaller size . . . . . *minimus*, sp. nov.
- 4 (1). First posterior cell almost sessile at end; abdomen with narrow bands of silvery toment at hind border of segments, and clothed moreover with a white pubescence . . . . . *sessilis*, Bez.

## EURYCARENUS MINIMUS, sp. nov.

A species of smaller size like *sessilis*, but with the first posterior cell stalked as in *laticeps*, and differing from both in the abdominal pattern.

Type ♂, and an additional specimen of the same sex from S.W. Protectorate, Tsumeb, December, 1919 (R. W. E. Tucker).

♂. Length of the body 7-8 mm.; of the wing 6.5-7.5 mm. Head as in *laticeps*, but the eyes of male approaching only at a point, without being in contact; frons and face with long, erect black hairs on the middle with soft golden-yellow hairs beneath them, and on the sides with long silvery hairs; palpi black with reddish base; proboscis entirely black, 3-3.5 mm. long. Antennae entirely black; third joint linear, twice as long as the two first joints together. Thorax and scutellum entirely black; on the back they are clothed with a golden-yellow soft pubescence, while on the pleurae the pubescence is white; dorsal macrochaetae black, those of the pleurae white; halteres whitish, the knob infuscated at base; squamulae dirty whitish, with a dark border and with whitish fringe. Abdomen entirely black, with complete rows of strong, erect, black bristles at the hind border

of the segments; it is clothed with black and yellowish hairs, the segments 3-6 being covered by an appressed yellowish tomentum in the shape of broad transverse bands; of these bands that of the third segment is interrupted in the middle, while those of the following segments are interrupted at the sides, thus forming a peculiar pattern; the fourth to fifth segments are clothed with long, erect, black hairs on the black portions. Venter with white hairs and with white pubescence; genitalia with reddish-brown lamellae. Legs entirely black, even the tibiae and tarsi; the four anterior femora and tibiae are clothed with white scales, while the hind tibiae are black-scaled. Wings hyaline, with the same venation as in *laticeps*; the veins are blackish on the apical and yellowish on the basal half.

HYPERUSIA, Bez.

HYPERUSIA SOROR, sp. nov.

Closely allied to *Hyp. minor* from Zululand, but smaller and distinct by the closed anal cell, by the third antennal joint being entirely reddish to the end, and by the darker legs.

Type ♀, a single specimen from S.W. Protectorate, Otjituo, January, 1920 (R. W. E. Tucker).

♀. Length of the body 3.2 mm.; of the wing 3 mm. Face quite black; third antennal joint clavate and entirely reddish-yellow, without a black end; proboscis a little less than 1 mm. in length. Thorax clothed on the back with whitish hairs, and destitute of golden-yellow tomentum. Abdomen as in *minor*, the golden tomentum being present even if scattered. Legs with darker tibiae, those of the hind pair being even blackish. Wings the same as in *minor*, but the anal cell is closed and briefly stalked like in the type-species of the genus.

GERON, Meig.

GERON HYBRIDUS, Meig.

A female specimen from S.W. Protectorate, Otjituo, January, 1920 (R. W. E. Tucker).

TOXOPHORA, Meig.

TOXOPHORA EPARGYRA, Hermann.

Zeitschr. für System. Hymenopt. and Dipterol., 1907, p. 201.

A male specimen from S.W. Protectorate, Otjituo, January, 1920 (R. W. E. Tucker).

Referred to the present species, lately described from the female sex, from Smyrna, Asia Minor, and not yet known from Africa. It differs

from all the other species in having the wings unspotted as in *maculata*, with the cross-vein between the discoidal and the second posterior cell not only angularly bent, but provided with a strong stump of vein directed outwardly into the second posterior cell. Such a character is known only for the North American species *amphites*, Walk. I assume therefore the present species to be the same as the Syrian one, notwithstanding the very different habitat.

Eyes touching in a line a little shorter than three times the small ocellar tubercle. The base of the antennae and the sides of the frontal triangle are provided with long white tufts; first antennal joint rather thin, with white scales on the outer side and below. Abdomen clothed on the back with white scales, but with the four rows of black spots not distinct. Legs black and white-scaled. Wings greyish-hyaline, slightly yellowish along the costal cell, on the base of the marginal and submarginal, and on the whole of the first basal cell.

#### PETROROSSIA.

##### PETROROSSIA HESPERUS TROPICALIS, subsp. n.

A female specimen from S.W. Protectorate, Otjituo, January, 1920 (R. W. E. Tucker).

The present subspecies is distinguished from the typical species by the white-haired face and first antennal joint, by the complete red stripe at the sides of the abdomen, by the mostly yellow femora, and by the upper branch of the cubital fork devoid of appendage.

Described originally from specimens from Nyassaland and other Central African localities.

#### ANTHRAX, Scop.

##### ANTHRAX FUSCIPENNIS, Ric.

A male specimen from S.W. Protectorate, Otjituo, January, 1920 (R. W. E. Tucker).

#### SPONGOSTYLUM, Macq.

##### SPONGOSTYLUM INCISURATA, Macq.

A female specimen from S.W. Protectorate, Windhoek, December, 1919 (R. W. E. Tucker).

#### THYRIDANTHRAX, Ost. Sack.

##### THYRIDANTHRAX LUGENS, Loew.

Some specimens from S.W. Protectorate, Grootfontein, January, 1920, and from Otjivarongo, February, 1920 (R. W. E. Tucker).

THYRIDANTHRAX TRANSIENS, Bezzi.

One specimen from S.W. Protectorate, Otjituo, January, 1920 (R. W. E. Tucker).

EXOPROSOPA, Macq.

EXOPROSOPA (EXOPROSOPA) FASTIDIOSA, sp. n.

Near *seniculus*, but distinct by the middle dark band of the wings being extended, through the apical half of the discoidal cell, to the hind border of the wing, or nearly so. The type is from the Nyasaland Protectorate; the abdomen shows transverse bands of white scales alone, while in the present specimen the fourth and fifth segments have yellowish bands like the second. Antennae entirely black.

One female specimen from S.W. Protectorate, Grootfontein, January, 1920 (R. W. E. Tucker).

EXOPROSOPA (EXOPROSOPA) HYPARGYRA, sp. nov.

Closely allied to *seniculus* and *fastidiosa*, but distinct from all the known species of their group on account of the broad patch of silvery scales on the sternopleura.

Type ♀, a single specimen from S.W. Protectorate, Tsumeb, December, 1919 (R. W. E. Tucker).

♀. Length of the body 12 mm.; of the wing 12 mm. Head as in *seniculus*, with not projecting proboscis; antennae entirely black, with the third joint elongate-conical as in *fastidiosa*. Thorax as in *seniculus*, but the sternopleurae are completely clothed with silvery scales, thus forming a broad triangular white spot, which is wanting in the allied species. Abdomen and legs as in *seniculus*; spines of the ovipositor black. Wings with the same nervation, but the small cell being very narrow at end and nearly closed (in *seniculus* and *fastidiosa* it is broadly open). The pattern is like that of *seniculus*, but the dark band of the fore border is shorter, ending into the marginal cell a little before the upper end of the marginal cross-vein (in the two other species it ends on or a little beyond the cross-vein); the middle cross-band is broad and long, crossing the discoidal cell on its apical third (but leaving its extreme external apex hyaline), filling up the whole base of the second posterior cell and entering into the upper part of the third posterior cell.

EXOPROSOPA (EXOPROSOPA) TUCKERI, sp. nov.

A species of the *dimidiata*-group and to be placed near it, distinct by the metapleural tuft being reddish yellow above and black below; by the apical cross-vein of the discoidal cell being short, straight, and placed obliquely; by the discoidal cell dilated at end at the upper

border alone. It is near *argyrophora*, Bezzi, from Nyassaland, but is distinct, the last abdominal segments being clothed with white scales.

Type ♂, a single specimen from S.W. Protectorate, Otjituo, January, 1920, collected by (R. W. E. Tucker), in whose honour it is named.

♂. Length of body 11 mm.; of wing 11 mm. Head deep black and black haired, with scattered yellowish scales on the frons; face conically produced; proboscis not at all projecting; antennae quite black, with the third joint briefly conical, as long as the two first joints together; style thin, as long as the third antennal joint. Thorax and scutellum entirely black, with black hairs and black bristles; on the back there are scattered yellowish hairs, which form a complete broad stripe on each side above the notopleural line; collar yellowish, pleuræ black haired, with a yellowish notopleural tuft; metapleural tuft yellowish above and black below; squamulae dark yellowish, with white fringe; halteres with yellow knob and dark stalk. Abdomen entirely black; first and second segment with dense white hairs on the sides, the rest of the sides with black hairs alone; on the back it is clothed with black and yellowish scales, the second and third segment and the sides of the sixth and seventh being clothed with silvery scales; venter black, black scaled and black haired. Legs quite black and black-scaled. Wings with black veins: terminal loop of second longitudinal vein double; first posterior cell not narrowed at end, about a half as broad as the second, which is as broadly open as the third; discoidal cell at end twice as broad as at base, its terminal cross-vein being short and straight; anal cell narrowed at end. The wings are typically dimidiate, black and hyaline; the limit between the two portions goes a little toothed from the end of the first longitudinal vein, over the base of the first submarginal and first posterior cells, across the basal third of the discoidal cell, over the base of the fourth posterior cell, over the two basal thirds of the anal cell to the basal half of the axillary lobe; praediscoidal spot broad and whitish.

EXOPROSOPA (EXOPROSOPA) PUNCTULATA, Macq.

A female from S.W. Protectorate, Tsumeb, December, 1919 (R. W. E. Tucker).

EXOPROSOPA (EXOPROSOPA) STANNUSI, Bezzi.

A female specimen from S.W. Protectorate, Otjivaronga, 1920.

EXOPROSOPA (EXOPROSOPA) LUTEICOSTA, Bezzi.

A female specimen from S.W. Protectorate, Tsumeb, December, 1919 (R. W. E. Tucker).



## EXOPROSOPA (EXOPROSOPA) CERVINA, sp. nov.

Closely allied to *luteicosta* and perhaps only a variety of it, but distinct by the smaller size and by the more lightly coloured body, chiefly on the abdomen, which is clothed with whitish and yellowish scales and devoid of tufts of black hairs at the sides.

Type ♀, an additional female specimen and a male specimen without a head, from S.W. Protectorate, Otjivarongo, Otjituo and Tsumeb, December, 1919, to January, 1920 (R. W. E. Tucker).

♂ ♀. Length of body 11–11.5 mm.; of wing 12–12.5 mm. Head black, reddish on the sides of face below and peristome, with yellowish scales and clothed with erect black hairs on the frons; antennae entirely black, with the third joint elongate, longer than the two first joints together, with a very short and thick terminal style; face conically produced; proboscis very little projecting. Thorax black, with yellowish hairs and yellowish scales, without black hairs even on the pleurae; only the bristles are black. Scutellum reddish, with black base, clothed like the thorax. Halteres dark yellowish; squamulae whitish, with white fringe. Abdomen of oval shape, entirely black; it is clothed above, with scales, without black hairs; all the hairs of the sides are yellowish; the scales are yellowish, being white only at base of the second segment, where they form a complete band, and on the sides of the third and of the two terminal segments. Venter black, with a reddish hind border on each segment, with white scales and white hairs; spines of the ovipositor reddish. Legs black, but with yellowish scales; the front tibiae are smooth and reddish; hind claws with a long and acute tooth. Wings hyaline, with the venation like that of *luteicosta*; veins yellowish, black on the apical half; the pattern is very reduced, consisting only in a faint yellowish tinge of the costal and subcostal cells, and in a faintly infuscated patch on the middle of the fore half. Over the base of the second longitudinal vein, the discal cross-vein and the end of the first basal cell, besides the lower apical cross-vein of the second basal cell between this and the fourth posterior cell, and the upper corner of the cross-vein between the third posterior and discoidal cell, are faintly margined with fuscous; but in the male specimen there is no trace of this infuscation.

## II.

## SYSTROPUS, Macq.

## SYSTROPUS SANGUINEUS, Bez.

Two examples bred from the pupa of an unidentified Notodont moth. Caledon. Cape (K. H. Barnard).

## OESTRANTHRAX, Bez.

## OESTRANTHRAX OBESUS, Loew.

An example from Durban, Natal, March 10th, 1919 (H. W. Bell-Marley) lacks the appendix projecting into the discoidal cell, but is typical in other respects.

The following note is appended to the specimen: "This fly came out of an old log containing Cossid larvae." Certain species of the related genus *Villa* are known to be parasitic upon larvae of nocturnal Lepidoptera.

## THYRIDANTHRAX, Ö. Sack.

## THYRIDANTHRAX VIDUATUS, Loew.

Dipteren-Fauna Süd-afrikas, p. 221, pl. ii, fig. 22.

Montagu, Cape, November, 1919 (R. M. Lightfoot).

Distinct from *T. lugens* and *T. transiens* in the long discoidal cell, in the first posterior cell distinctly narrowed at end, and in the lighter pattern of the base of the wing.

## SYSTEMATIC ARRANGEMENT OF THE GENERA AND SPECIES.

## BOMBYLIINAE.

## BOMBYLIUS, L.

lateralis, Fab.  
bombiformis, Bez.  
haemorrhoidalis, Bez.  
acroleucus, Bez.  
mutilatus, Bez.  
kilimandjaricus, Speis.  
furiosus, Walk.  
ornatus, Wied.  
rufiventris, Macq.  
mollis, Bez.  
disjunctus, Bez.  
eurhinatus, Bez.  
brachyrrhynchus, Bez.  
globulus, Bez.  
impurus, Loew.  
mundus, Loew.  
sessilis, Bez.  
xanthocerus, Bez.  
marginellus, Bez.  
paterculus, Walk.  
ruficeps, Macq.

purpureus, Bez.  
micans, Fabr.  
hypoleucus, Wied.  
hirtus, Loew.  
servillei, Macq.  
capensis, L.  
megaspilus, Bez.  
braunsi, Bez.  
punctatellus, Bez.  
punctifer, Bez.  
pentaspilus, Bez.  
obesus, Bez.  
spinibarbus, Bez.  
angulosus, Bez.  
nigripecten, Bez.  
peringueyi, Bez.  
argentifer, Walk.  
molitor, Wied.  
hirticeps, Bez.

SYSTOECHUS, Loew.  
scabirostris, Bez.  
ventricosus, Bez.  
simplex, Loew.

- tumidifrons, Bez.  
 albidus, Loew.  
 nigripes, Loew.  
 mixtus, Wied.  
 stenopterus, Mik.  
 spinithorax, Bez.  
 fuliginus, Loew.
- ANASTOECHUS, O. Sack.  
 rubricosus, Wied.  
 varipecten, Bez.  
 cervinus, Loew.  
 erinaceus, Bez.  
 macrophthalmus, Bez.  
 innocuus, Bez.  
 leucosoma, Bez.
- EURYCARENUS, Loew.  
 laticeps, Loew.  
 sessilis, Bez.  
 minimus, Bez.
- DISCHISTUS, Loew.  
 capito, Loew.  
 plumipalpis, Bez.  
 rubicundus, Bez.  
 niveus, Macq.  
 ovatus, Bez.  
 seriatus, Wied.  
 vittipes, Bez.  
 variegatus, Macq.  
 tripunctatus, Macq.  
 coracinus, Loew.  
 pectoralis, Loew.
- SESYOMYIA, Bez.  
 carnata, Bez.
- CYTHEREINAE.
- ONIROMYA, Bez.  
 pachycerata, Big.
- USIINAE.
- CORSOMYZA, Wied.  
 simplex, Wied.  
 pennipes, Wied.  
 nigripes, Wied.  
 hirtipes, Macq.  
 clavicornis, Wied.  
 anceps, Bez.  
 bicolor, Bez.  
 ruficornis, Bez.
- CALLYNTHROPHORA, Sch.  
 marginifrons, Bez.
- GNUMYA, Bez.  
 brevirostris, Bez.
- HYPERUSIA, Bez.  
 minor, Bez.  
 soror, Bez.
- MEGAPALPUS, Macq.  
 nitidus, Macq.  
 fulviceps, Bez.
- PTHIRIINAE.
- GONARTHUS, Bez.  
 leucophys, Big.  
 xanthinus, Bez.  
 cygnus, Big.  
 chioneus, Bez.  
 cylindricus, Bez.
- CROCIDIUM, Loew.  
 poecilopterum, Loew.  
 nigrifacies, Bez.
- PSEUDEMPIS, Bez.  
 heteroptera, Wied.
- PTHIRIA, Meig.  
 laeta, Bez.  
 lanigera, Bez.  
 pubescens, Bez.
- GERON, Meig.  
 hybridus, Meig.  
 barbatus, Bez.  
 luctuosus, Bez.  
 leptocerus, Bez.  
 dichromus, Big.
- APOLYSIS, Loew.  
 humilis, Loew.
- SYSTROPINAE.
- SYSTROPUS, Wied.  
 leptogaster, Loew.  
 sanguineus, Bez.  
 snowi, Ad.
- TOXOPHORINAE.
- TOXOPHORA, Meig.  
 maculata, Ross.  
 punctipennis, Bez.  
 epargyra, Herm.  
 diploptera, Speis.  
 caeruleiventris, Karsch.

## CYLLENIINAE.

NOMALONIA, Rond.

afra, Macq.

HENICA, Macq.

longirostris, Wied.

PERINGUEYIMYIA, Big.

capensis, Big.

## LOMATIINAE.

LOMATIA, Meig.

acutangula, Loew.

longitudinalis, Loew.

litrata, Loew.

pictipennis, Wied.

simplex, Wied.

infusata, Bez.

conocephala, Macq.

pulchriceps, Loew.

latiuscula, Loew.

tenera, Loew.

PTERAULAX, Bez.

flexicornis, Bez.

PETROROSSIA, Bez.

hesperus, Ross.

vinula, Bez.

fulvipes, Loew.

tropicalis, Bez.

## ANTHRACINAE.

ANTHRAX, Scop.

pithecius, Fabr.

hessii, Wied.

diffusus, Wied.

aygulus, Fabr.

trimaculatus, Wulp.

pusillus, Wied.

hemimelas, Speis.

fuscipennis, Ric.

SPONGOSTYLUM, Macq.

muticum, Bez.

incisurale, Macq.

punctipenne, Wied.

## EXOPROSOPINAE.

VILLA Lioy.

flavipes, Loew.

albescens, Loew.

sexfasciata, Wied.

vitripennis, Loew.

argentina, Bez.

lasia, Wied.

leucochila, Bez.

OESTRANTHRAX, Bez.

obesus, Loew.

SYNTHESIA, Bez.

fucoides, Bez.

THYRIDANTHRAX, O. Sack.

flammiger, Walk.

leucoproctus, Loew.

linea, Loew.

abruptus, Loew.

transiens, Bez.

lugens, Loew.

calochromatus, Bez.

ternarius, Bez.

laetus, Loew.

viduatus, Loew.

LITORRHYNCHUS, Macq.

maurus, Thunb.

tollini, Loew.

argyrolepis, Bez.

EXOPROSOPA (METAPENTA).

pentala, Macq.

corvina, Loew.

(ACRODISCA).

fimbriatella, Bez.

offuscata, Bez.

personata, Bez.

angulata, Loew.

(DEFILIPPIA).

neurospila, Bez.

venosa, Wied.

nigrovenosa, Bez.

maculosa, Wied.

maculifera, Bez.

strenua, Loew.

hirtipes, Loew.

(PTEROBATES).

apicalis, Wied.

(EXOPROSOPA).

formosula, Bez.

nemesia, Fabr.

morosa, Loew.

ignava, Loew.

seniculus, Wied.  
elongata, Ric.  
argentifrons, Macq.  
capensis, Wied.  
infumata, Bez.  
eluta, Loew.  
heros, Wied.  
dux, Wied.  
sigmoidea, Bez.  
dimidiata, Macq.  
dilatata, Bez.  
punctulata, Macq.  
perpulchra, Bez.  
parvula, Bez.

stannusi, Bez.  
inaequalipes, Loew.  
batrachoides, Bez.  
balioptera, Loew.  
pediformis, Bez.  
luteicosta, Bez.  
parvicellula, Bez.  
fastidiosa, Bez.  
hypargyra, Bez.  
tuckeri, Bez.  
cervina, Bez.

HYPERALONIA, Rond.  
coleoptrata, Bez.  
vittata, Ric.

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## EXPLANATION OF PLATES.

## PLATE I.

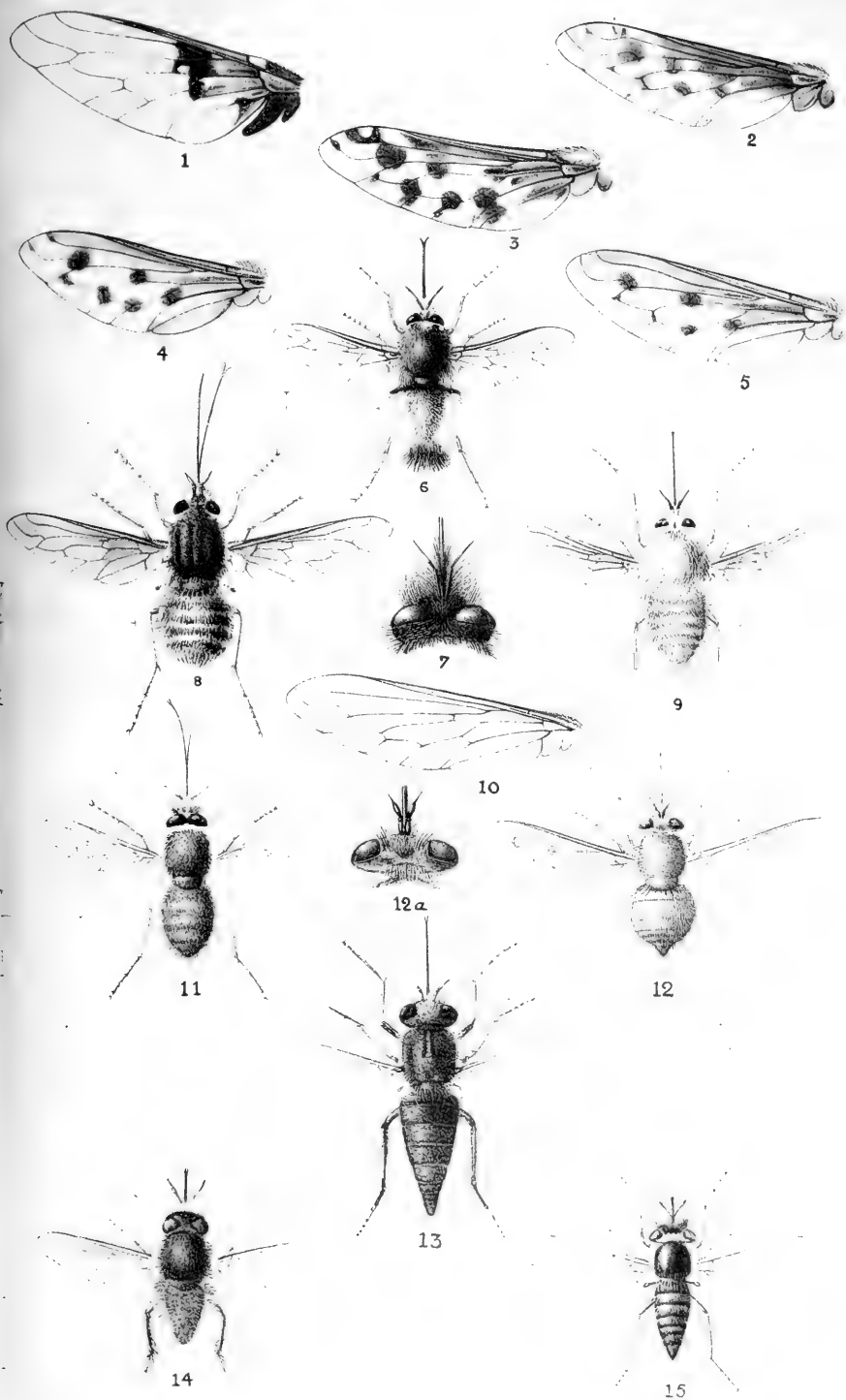
FIG.

1. *Bombylius mutilatus*, n. sp. Wing.
2. „ *capensis*, Lin. Wing.
3. „ *megaspilus*, n. sp. Wing.
4. „ *punctatellus*, n. sp. Wing.
5. „ *pentaspilus*, n. sp. Wing.
6. „ *peringueyi*, n. sp. Whole insect.
7. „ *hirticeps*, n. sp. Head.
8. *Systoechus scabrirostris*, n. sp. Whole insect.
9. *Anastoechus rubricosus*, Wied. Whole insect.
10. *Eurycarenum sessilis*, n. sp. Wing.
11. *Dischistus plumipalpis*, n. sp. Whole insect.
12. *Sosioimyza comata*, n. sp. Whole insect and head magnified.
13. *Oniomyza pachycerata*, Big. Whole insect.
14. *Corsomyza pennipes*, Wied. Whole insect.
15. *Callynthrophora magnifrons*, n. sp. Whole insect.

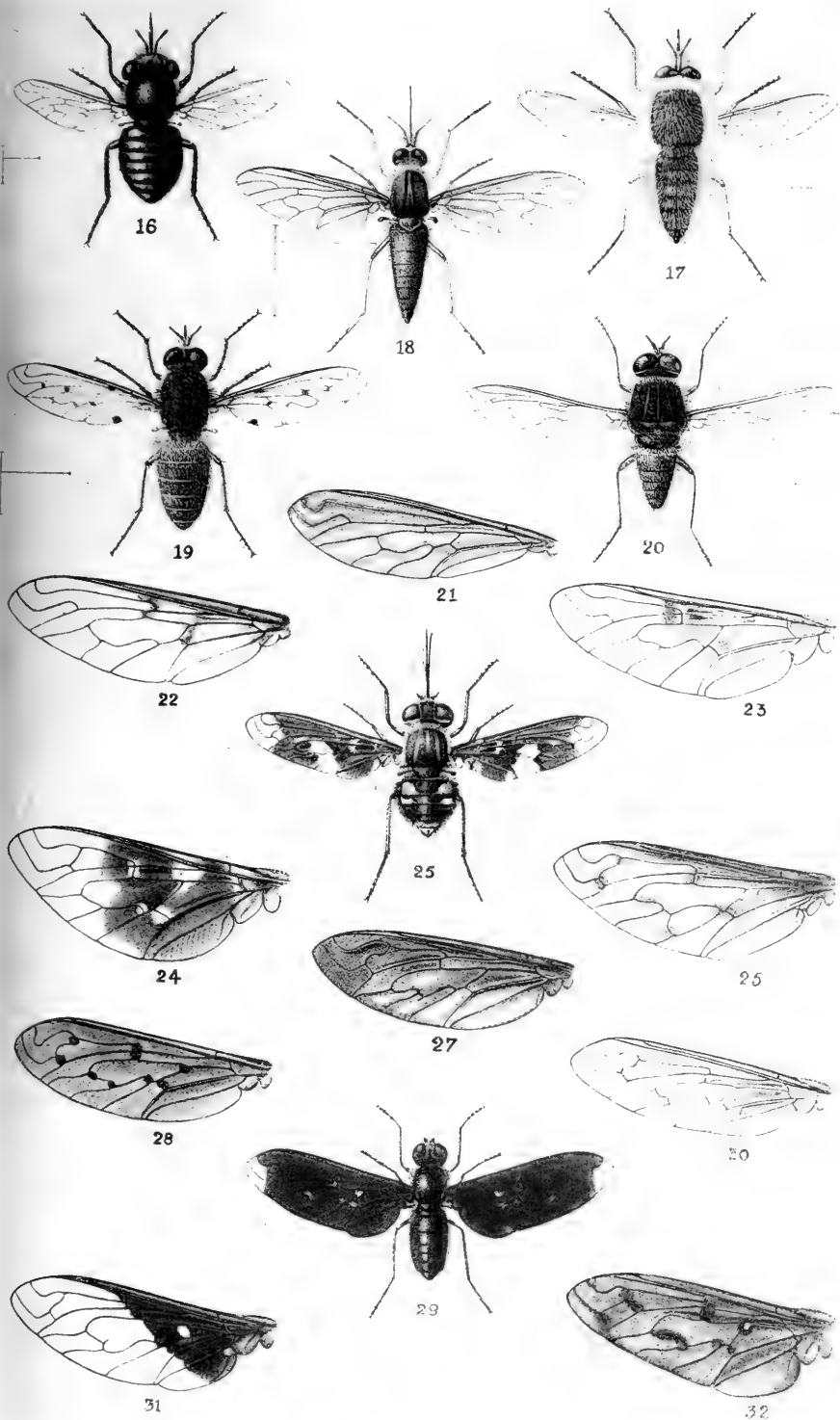
## PLATE II.

FIG.

16. *Megapalpus nitidus*, Macq. Whole insect.
17. *Gonarthrus cygnus*, Big. Whole insect.
18. *Pseudempis heteroptera*, Wied. Whole insect.
19. *Peringueyimyza capensis*, Big. Whole insect.
20. *Pteraulax flexicornis*, n. sp. Whole insect.
21. *Petrorossia vinula*, n. sp. Wing.
22. *Spongostylum muticum*, n. sp. Wing.
23. *Thyridanthrax calochromatus*, n. sp. Wing.
24. „ *ternarius*, Bez. Wing.
25. *Litorrhynchus maurus*, Thunb. Whole insect.
26. *Ecoprosopa pentala*, Macq. Wing.
27. „ *offuscata*, n. sp. Wing.
28. „ *neurospila*, n. sp. Wing.
29. „ *nemesis*, Fabr. Whole insect.
30. „ *capensis*, Wied. Wing.
31. „ *dilatata*, n. sp. Wing.
32. *Hyperalonia coleoptrata*, n. sp. Wing.









2.—*The Crane-flies of South Africa in the South African Museum*  
(*Diptera, Tipulidae*).—By CHARLES P. ALEXANDER, Ph.D.

PART II.

(With Plates III and IV.)

SINCE the publication of the first instalment under this title (*Ann. South African Mus.*, vol. xvii, pt. ii, no. 5, pp. 139–182, Pls. X–XIV, 1917) Dr. Péringuey has continued to send me lots of specimens of this family of flies for determination. In the present article not only are some new and insufficiently described species characterised and figured, but the additional distribution of other species is included in order to supplement our meagre knowledge of the subject. In order to conserve space, in this and succeeding parts under this title, the references to genera and species that have been considered in earlier parts will not be repeated, but genera and species introduced for the first time will be given a detailed reference as hitherto. I am deeply indebted to Dr. Péringuey and to the collectors of this material for the privilege of studying these interesting lots of crane-flies.

FAMILY TIPULIDAE.

SUB-FAMILY LIMNOBIINAE.

TRIBE LIMNOBIINI.

GEN. DICRANOMYIA, Stephens.

DICRANOMYIA TIPULIPES, Karsch.

Additional records of distribution for this common and wide-spread Ethiopian species are as follows :

♀, Angra Pequena, S.W. Protectorate, September, 1917 (Dr. Knobel).

♀, Pretoria, Transvaal, January 29th, 1915 (H. K. Munro).

♂ ♀, Krantzkop, Natal, November, 1917 (K. H. Barnard).

## DICRANOMYIA GARDINERI, Edwards.

1912. *Dicranomyia gardineri*, Edwards, Trans. Linn. Soc. Lond., vol. 15, pt. 2, pp. 197, 198.

The following specimens were included in the collection:

♀, Barberton, Transvaal, May 6th, 1913 (H. K. Munro).

♀, Maritzburg, Natal, 1917 (K. H. Barnard).

♂ ♀, Krantz kop, Natal, November, 1917 (K. H. Barnard).

♀, Arcturus, Salisbury, Rhodesia, 1916 (Dr. Melle).

The wing is shown on Plate III, fig. 1.

## DICRANOMYIA PERINGUEYI, Alexander.

One male and two females from Oudebosch, Caledon, Cape Colony, altitude 1500 ft., January, 1919 (K. H. Barnard). The exact locality of the type was unknown, but it now seems probable that it came from the same general region as the above specimens. The type seems to be somewhat discoloured, being darker in colour than the fresh specimens mentioned above.

## DICRANOMYIA CONFUSA, sp. n.

Close to *D. peringueyi*; size smaller, wing of male not exceeding 5.5 mm.; general coloration pale testaceous yellow; cell 1st  $M_2$  small, subquadrate.

*Male*.—Length 4.4–4.1 mm.; wing, 5.3–5.5 mm.

Rostrum unusually long for this genus of flies, somewhat as in the Nearctic *D. rostrifera*, O. S.; the condition is very similar to that found in *D. peringueyi*, being a little more than half the length of the head; rostrum and palpi dark brown. Antennae with the scapal segments pale brownish-yellow, the flagellum dark brown; basal flagellar segments short-oval, gradually lengthening to the end of the organ. Head dark grey.

Thorax pale yellowish testaceous, the praescutum with an indistinct pale median stripe. Pleura dull yellow. Halteres dark brown. Legs pale yellowish testaceous, the tarsi more brownish. Wings subhyaline; stigma oval, brown; veins dark brown. Venation: *Sc* long, extending to about mid-length of the sector,  $Sc_2$  at the tip of  $Sc_1$ ; cell 1st  $M_2$  very small, subquadrate, the veins issuing from it correspondingly long; basal deflection of  $Cu_1$  a little before the fork of *M*.

Abdominal tergites brown, the sternites more yellowish.

*Habitat*.—South Africa.

Holotype, ♂, Krantz kop, Natal, November, 1917 (K. H. Barnard).

Paratopotypes, 2 ♂ ♂.

Type in the South African Museum.



This inconspicuous *Dicranomyia* has been confused with *D. peringueyi* of Cape Colony, both species agreeing in the slightly produced rostrum and the general features of venation. *D. confusa* may most readily be told by the small size, the pale testaceous yellow coloration and the small cell 1st  $M_2$ .

The wing is shown on Plate III, fig. 3.

*DICRANOMYIA CAPICOLA*, sp. n.

Antennae black throughout; mesonotal praescutum black, the humeral regions paler; pleura pale brown, greyish pruinose; wings greyish subhyaline, veins brownish-black; *Sc* long, cell 1st  $M_2$  closed.

*Male*.—Length 5.5 mm.; wing 7 mm.

*Female*.—Length about 6.2 mm.; wing 7.4 mm.

Rostrum and palpi dark brown. Antennae black, the flagellar segments short oval. Head dark brown, grey pruinose.

Pronotum dark brown, the scutellum yellowish. Mesothorax convex. Mesonotal praescutum brown, with a broad, shiny, brownish-black median stripe and shorter lateral stripes that are quite confluent behind, so almost the whole disc is of this colour; scutum brownish-black, except the median area, which is densely buffy pollinose; scutellum dark brown; postnotum similar, very sparsely grey pruinose. Pleura pale brown, greyish pruinose, especially heavy between the fore and middle coxae. Mesosternum slightly infuscated. Halteres brown, the knobs darker. Legs with the coxae light brownish-yellow; trochanters yellow; remainder of the legs dark brown except the extreme base of the femora, which is pale. Wings greyish subhyaline; stigma long-oval, brown, practically all proximad of *r*; veins brownish-black. Venation: *Sc* moderately long,  $Sc_1$  ending a little beyond one-third the length of *Rs*,  $Sc_2$  at its tip; *Rs* more than twice the length of the basal deflection of  $R_{4+5}$ , arcuated or angulated at origin; *r* pale, at the tip of  $R_1$ ; cell 1st  $M_2$  small, pentagonal; cell 2nd  $M_2$  longer than cell  $M_3$ , *m* being rather long and arcuated; basal deflection of  $Cu_1$  at or before the fork of *M*.

Abdominal tergites uniformly dark brown, the sternites more yellowish; hypopygium reddish-brown. Ovipositor with the valves rusty-chestnut.

*Habitat*.—South Africa.

Holotype, ♂, Hottentot-Hollands Mountains, altitude 3000 ft., Caledon, Cape Colony, March, 1919 (K. H. Barnard).

Allotopotype, ♀.

Paratype, ♀, French Hoek, Cape Colony, altitude 2500–3600 ft., December 4th, 1916 (K. H. Barnard).

## GEN. RHIPIDIA, Meigen.

## RHIPIDIA AFRA, Bergroth.

Two male specimens from Krantzkop, Natal, November, 1917 (K. H. Barnard). A large male from the Hottentot-Hollands Mts., Caledon, Cape Colony, 1917 (K. H. Barnard). As stated by Edwards, this species runs uncomfortably close to the genus *Dicranomyia*, and should perhaps be referred to that genus.

## RHIPIDIA MIOSEMA (Speiser).

1909. *Limonia miosema*, Speiser, Sjöstedts Kilimandjaro-Meru Exped., 10, Dipt., pt. 4, pp. 50, 51.

A female of this species from the type-locality, Kilimandjaro, 1916 (W. West). Cedara, Natal, April 18th, 1920 (S. H. Skaife).

The wing has never been figured, and is shown on Plate III, fig. 2.

## GEN. GERANOMYIA, Haliday.

1833. Entomol. Mag., vol. 1, p. 154.

## SUB-GEN. MONOPHANA, Edwards.

1912. Trans. Linn. Soc. Lond., vol. 15, pt. 2, p. 200.

## GERANOMYIA (MONOPHANA) SUBIMMACULATA, sp. n.

Rostrum short; mesonotum shiny yellow with three indistinct reddish stripes; wings pale brown, the stigma indistinct; *r* at the tip of  $R_1$ .

*Female*.—Length, excluding the rostrum, 7.1 mm.; wing 8 mm.; rostrum 1.4 mm.

Rostrum short, black; palpi uniarticulate, black. Antennae very short, dark, the flagellar segments subglobular. Head grey.

Thorax shiny yellowish, the praescutum with three rather indistinct reddish stripes, the broad lateral stripes continued backward on to the scutal lobes. Pleura brownish-testaceous. Halteres brown. Legs with the coxae brownish-yellow, the terminal segments of the latter darker. Wings with an indistinct brown tinge, the costal region a little more yellowish; stigma indistinct; veins dark brown. Venation (Plate III, fig. 4):  $Sc_2$  far removed from the tip of  $Sc_1$ ; *r* at the tip of  $R_1$ .

Abdomen dark brownish-black, the ovipositor and its valves brighter, the sternal valves deeply split.

*Habitat*.—South Africa.

Holotype, ♀, Krantz Kloof, Natal, June, 1916 (Marley).

Type in the South African Museum.

This species agrees closely with the type of the sub-genus, *G. immaculata*, Edwards, in the subgeneric characters; it is a much larger species (*immaculata*, ♀, length 5 mm.; wing 5.5 mm.), with the venation and coloration different. Edwards' figure of *immaculata* shows cross-vein *r* very long and strongly deflected at its outer end.

GERANOMYIA (GERANOMYIA) SEX-OCCELLATA, sp. n.

Rostrum long, black; legs brownish-black; wings with a heavy ocellate pattern along the costal margin.

*Male*.—Length, excluding rostrum, 7.5 mm.; rostrum alone, 4.3 mm.; wing, 7.7 mm.; hind legs, femur, 6.8 mm.; tibia, 7.7 mm.

Rostrum elongate, black, the paraglossae strongly recurved at their tips, with sparse hairs along the margin; palpi small, black, apparently two-segmented; between the paraglossae a straight, slender rod that is deeply bifid at its apex. Antennae black, the flagellar segments short-oval. Head blackish, discoloured in the type.

Thoracic dorsum discoloured in type, reddish-brown, paler along the margin of the praescutum; an indistinct darker median stripe; scutellum reddish-brown with a narrow median brown line; postnotum brownish-black. Pleura reddish-yellow, with a narrow dark brown dorsal stripe extending from the cervical sclerites backward, becoming indistinct beneath the wing-root. Halteres brown, the knobs dark brown. Legs with the coxae and trochanters dull yellow, femora dark brown, brighter at the base; tibiae and tarsi brownish-black. Wings subhyaline, the cells in the posterior half of the wing more greyish; along the costal margin a series of seven brown markings, all except the last of which possess large brownish-yellow centres to produce an ocellate appearance; the largest of these ocellate blotches are located at the origin of *Rs*, tip of *Sc* and tip of *R*<sub>1</sub>; in shape they are broadest along the costal margin, narrowed posteriorly, the first and third reaching vein *M*, the fifth and sixth reaching *R*<sub>4+5</sub>; the seventh, solid, marking is the smallest, located at the tip of *R*<sub>4+5</sub>; heavy brown seams along the cord and the outer end of cell 1st *M*<sub>2</sub>; a small brown spot at the tip of 1st *A* and a much larger one at the tip of 2nd *A*. Venation: *Sc* long, ending slightly before the fork of the sector, *Sc*<sub>2</sub> at the tip of *Sc*<sub>1</sub>; *Rs* long, strongly angulated at its origin, about twice the length of the deflection of *R*<sub>4+5</sub>; *r* at the tip of *R*<sub>1</sub>; *r-m* short; cell 1st *M*<sub>2</sub> long, the veins issuing from it short; basal deflection of *Cu*<sub>1</sub> far before the fork of *M*, *Cu*<sub>1</sub>+*M* being more than half the length of the basal deflection of *Cu*<sub>1</sub> alone.

Abdomen dark brown, the sternites more yellowish. Ovipositor with the tergal valves slender, straight, acicular, divergent; sternal valves flattened, gradually narrowed to the subacute tips.

*Habitat*.—South Africa.

Holotype, ♀, Oudebosch, Caledon, Cape Colony, altitude 1500 ft., January, 1919 (K. H. Barnard).

Type in the South African Museum.

GERANOMYIA (GERANOMYIA) RUBRITHORAX, sp. n.

General coloration reddish-orange; wings greyish-yellow, the stigma pale brown;  $Sc_2$  present; cell 1st  $M_2$  long and narrow;  $Cu_2$  longer than the basal deflection of  $Cu_1$ .

*Male*.—Length (excluding rostrum) 6·7 mm.; wing 7 mm.

*Female*.—Length (excluding rostrum) 7 mm.; wing 7·9 mm.; rostrum alone 2·8 mm.

Rostrum long and stout, its exact length uncertain as it is broken a short distance beyond the palpi, dark brown in colour; palpi bi-articulate as in the subgenus. Antennae black throughout, the flagellar segments short-oval with a short white pubescence; verticils short, secund. Eyes large, the vertex very narrow, dark brownish-grey, the under side of the head more yellowish.

Mesonotum reddish-orange, the praescutum without distinct darker markings. Pleura reddish-yellow. Halteres brown, the base of the stem pale. Legs with the coxae and trochanters yellow; femora brownish-yellow, the tips darker; tibiae brown; tarsi dark brown. Wings with a strong greyish-yellow tinge; stigma rather large, rather indistinct, pale brown; veins dark brown. Venation:  $Sc$  short,  $Sc_1$  ending a short distance beyond the origin of  $Rs$ ;  $Sc_2$  distinct, some distance from the tip of  $Sc_1$  and proximad of the origin of  $Rs$ ;  $Sc_1$  more than one-half the length of the basal deflection of  $Cu_1$  alone;  $r$  indistinct, at the tip of  $R_1$ ;  $Rs$  strongly arcuated at origin; basal deflections of  $R_4+5$  and  $Cu_1$  subequal; cell 1st  $M_2$  long and narrow, longer than that portion of  $Cu_1$  beyond it; basal deflection of  $Cu_1$  a short distance before the fork of  $M$ ;  $Cu_2$  longer than the basal deflection of  $Cu_1$ .

Abdomen brownish-yellow. Male hypopygium orange-yellow; pleurites rather slender, the ventral caudal angle produced caudad and slightly proximad into a conspicuous cylindrical fleshy lobe that is provided with long hairs; ventral pleural appendage fleshy, a little shorter than the pleurites, rather narrow, the tips obtuse, the proximal cephalic margin produced into a slender arm that bears two stout spines before its apex; dorsal pleural appendage moderately long.

curved, suddenly narrowed before the acute tips; penis-guard and gonapophyses relatively small.

*Habitat*.—South Africa.

Holotype, ♂, French Hoek, Cape Colony, altitude 2500–3600 ft., December 4th, 1916 (K. H. Barnard).

Allotype, ♀, Paarl, Cape Colony, October, 1919 (Rev. G. Hawke).

Types in the South African Museum.

Superficially, *Geranomyia rubrithorax* resembles *G. subimmaculata*, sp. n., but is readily told by the two-segmented palpi and the distinct wing-venation.

GEN. LIMNOBIA, Meigen.

LIMNOBIA IRRORATA (Enderlein).

1912. *Limonia irrorata*, Enderlein, Zool. Jahrb., vol. 32, pt. 1, pp. 74, 75, fig. 1.

Cedara, Natal, April 16th, 1920 (S. H. Skaife).

The brown dots on the wing are much more sparse and scattered than is usual in this species.

TRIBE ANTOCHINI.

GEN. ATARBA, Osten Sacken.

ATARBA CAPENSIS, Alexander.

In the collection was a small male from Knysna, Cape Colony, October, 1916 (L. Péringuey). It agrees with the type, but is considerably smaller, with narrower wings. The length is only 3·6 mm., the wing 3·8 mm.; subcosta is short, ending before the origin of the sector. In spite of these discrepancies I believe the specific reference as given above to be correct.

GEN. ORIMARGULA, Mik.

1883. Wiener Entomol. Zeitung, vol. 2, p. 198.

ORIMARGULA TRANSVAALIA, sp. n.

General coloration reddish-yellow or greyish-brown; wings milky white without a distinct stigma.

*Male*.—Length 3·5 mm.; wing 4·6 mm.

Rostrum light yellow, on the nasal region with a few long hairs; the labium long, brownish-yellow; maxillary palpi long, the base light brown, soon passing into black. Antennae with the scape brownish-yellow, the flagellar segments oval, black, with a long coarse white pubescence. Head light grey.

Cervical region very long and narrow. Mesonotum pale greyish-yellow with a sparse whitish bloom, most distinct on the scutum. Pleura yellowish with a sparse white bloom. Halteres pale. Legs yellowish, the tips of the femora slightly brownish, tips of the tibiae narrowly blackened; apical tarsal segment brownish. Wings milky grey or white, veins brown, those along the costa more yellowish; anal angle square, prominent. Venation: Costa incassated near the end of  $R$ ;  $R$  ending nearly opposite mid-length of the deflection of  $R_4+5$ ;  $R_s$  straight or even slightly convex;  $R_2+3$  very weak, tending to atrophy;  $r$  present, a little more than its own length beyond the fork of  $R_s$ ;  $r-m$  longer than the petiole of cell  $M_3$ , but shorter than the basal deflection of  $Cu_1$ ; basal deflection of  $Cu_1$  inserted slightly beyond the level of the fork of  $R_s$ , the fusion of  $Cu_1$  and  $M_3$  being a little shorter than the deflection of  $R_4+5$ .

Abdominal tergites brownish-yellow, the segments with broad posterior margins of dirty silvery.

*Habitat*.—South Africa.

Holotype, ♂, Komati Poort, Eastern Transvaal, November, 1918 (R. W. Tucker).

Paratopotypes, 3 ♂♂.

Type in the South African Museum.

The paratypes represent a greyish-brown dimorphic form in which the entire body is much darker than in the type described. A very similar condition is found in the related genus *Antocha*.

This tiny species differs from the much larger genotype, *O. alpigena*, Mik (Austrian Alps), in general coloration, the lack of a stigma and in the venational details, *i.e.* the slightly convex radial sector,  $r$  far proximal of  $r-m$ ; the long basal deflection of  $R_4+5$  and fused portion of  $Cu_1 + M$ , and the shorter but more divergent branches that enclose cell  $M_3$ .

#### GEN. ELEPHANTOMYIA, Osten Sacken.

##### ELEPHANTOMYIA INSULARIS PSEUDOSIMILIS, sub-sp. n.

General coloration dark with a grey pruinosity; legs dark brown; wings greyish with a heavy brown pattern along the cord and outer end of cell 1st  $M_2$ .

*Sex*?. Rostrum 6.5 mm.; wing 7.8 mm.; head and thorax combined 2.6 mm.; fore legs—femur 6.7 mm., tibia 9 mm.

Rostrum long and slender, dark brownish-black, including the small mouth-parts and palpi. Antennae black, the first flagellar segment paler, brown; the enlarged conical first segment of the flagellum is

made up of the fusion of two segments, there being twelve segments beyond it, the first of these very short-cylindrical, the remainder gradually elongated; verticils short, scarcely exceeding the pale pubescence, except on the last four segments, where they are greatly elongated and very conspicuous. Eyes large, contiguous beneath, the vertex greatly narrowed; vertex grey, lightest on the front; this region of the head is apparently discoloured, and the whole vertex may be light grey.

Neck elongate. Mesonotum dark, the praescutum with three darker stripes; a pale area between the scutal lobes; any pruinosity of the thorax is destroyed, but small areas persisting on the pleura show that this region at least is light grey pruinose. Halteres brown, the stems paler. Legs with the coxae pale, the fore coxae with the outer face darkened, trochanters brown; femora dark brown, more yellowish at the base; tibiae and tarsi dark brown. Wings with a pale greyish tinge, the costal and subcostal cells more yellowish; a large rounded brown spot at the origin of  $Rs$ ; broad brown seams along the cord and outer end of cell  $1st\ M_2$ ; stigma elongate-oval, brown; veins dark brown. Venation:  $Sc$  ending just before the fork of  $Rs$ ,  $Sc_2$  at the tip of  $Sc_1$ ;  $R_2+3$  long, running parallel to  $R_4+5$  so that cell  $R_3$  is scarcely widened at the wing margin; cell  $1st\ M_2$  large, basal deflection of  $Cu_1$  at about two-fifths of its length.

Abdomen broken beyond the first segment, which is greyish.

*Habitat*.—South Africa.

Holotype, sex ?, Oudebosch, Caledon, Cape Colony, altitude 1500 ft., January, 1919 (K. H. Barnard).

Type in the South African Museum.

This fly is closely related to the larger typical form, *E. insularis*, Edwards, of the Seychelles Islands, but seemingly represents a distinct race. The rostrum is shorter, the thorax not ochraceous,  $m$  a little shorter than the outer deflection of  $M_3$ , etc. Unfortunately Edwards does not figure the venation or describe it in detail. The present fly almost reproduces the venation of the genotype, *E. westwoodi*, O. S. (North-Eastern North America), except that the radial sector and cell  $1st\ M_2$  are considerably longer. The wings of this new *Elephantomyia* superficially resemble those of *Rhamphidia capensis*, Alex., in the nature of the brown pattern. Besides the generic characters, however, the present insect is readily told by the lack of brown markings proximad of the sector and by the cell  $R_3$  not being widened at the wing margin.

## TRIBE ERIOPTERINI.

## GEN. ERIOPTERA, Meigen.

## SUB-GEN. EMPEDA, Osten Sacken.

## ERIOPTERA (EMPEDA) BONAE SPEI, Alexander.

Two females from M'fongosi, Zululand, May, 1917 (W. E. Jones).

## ERIOPTERA (EMPEDA) CLAUSA, sp. n.

Size very small, wing of the male 3 mm.; general coloration yellowish-brown; wings subhyaline; cell 1st  $M_2$  closed, basal deflection of  $Cu_1$  far beyond the fork of  $M$ .

*Male*.—Length about 2 mm; wing 3 mm.

Rostrum and palpi dark brown. Antennae brown, the flagellar segments oval with moderately long verticils and a coarse white pubescence. Head brown. Eyes with large, coarse ommatidia.

Pronotum dark, the sides of the pronotal scutellum almost white. Mesonotal praescutum dark brown, the broad lateral margins and the humeral region somewhat brighter; pseudosutural foveae large, conspicuous; scutum with the lobes dark brown, the median area paler; scutellum projecting, dark brown, margined caudally with dull yellow; postnotum dark brown. Pleura dull yellowish, with two indistinct dark brown stripes, one on either side of a yellowish line that extends from behind the fore coxae to the base of the halteres; sternum dull yellow. Halteres very large, brown, the knobs dark brown. Legs with the coxae and trochanters dull yellow; remainder of the legs pale brown. Wings with a faint darker tinge, the stigma pale brown, indistinct; veins dark brown. Venation:  $Sc$  rather short, ending before mid-length of the sector,  $Sc_2$  almost at the tip of  $Sc_1$  and subequal to it; cell 1st  $M_2$  closed, rather long and narrow; basal deflection of  $Cu_1$  far beyond the fork of  $M$ , at about two-fifths the length of cell 1st  $M_2$ .

Abdomen dull brownish-yellow, the lateral margins darker brown. Pleurites of the male hypopygium apparently with three slender appendages; outer appendage longest, shaped as a pale, flattened, compressed arm that resembles the blade of a cutlass; the second appendage is somewhat similarly shaped but much smaller; the third appendage is heavily chitinated, slender, slightly bent, the tip acutely pointed. The type is unique, and the structure of the hypopygium can only be discussed in the general terms given above.

*Habitat*.—South Africa.

Holotype, ♂, French Hoek, Cape Colony, altitude 2500–3600 feet, December 4th, 1916 (K. H. Barnard).



Type in the South African Museum.

This tiny crane-fly is related to the much larger *E. bonae spei*, Alexander (South Africa), but is readily told by the closed cell 1st  $M_2$ —a character possessed by most European species and two Nearctic species of the sub-genus *Empeda*.

SUB-GEN. ERIOPTERA, Meigen.

ERIOPTERA (ERIOPTERA) PERINGUEYI, Bergroth.

A female from Krantzkop, Natal, November, 1917 (K. H. Barnard).

ERIOPTERA (ERIOPTERA) CLARIPENNIS, sp. n.

Coloration dark brownish-black, dusted with grey; wings subhyaline, the extreme base yellowish, veins dark brown; cell 1st  $M_2$  open, second anal vein short, straight.

*Female?*—Length 3 mm.; wing 4.4 mm. Fore leg, femur 1.8 mm.; tibia 2.3 mm.; hind leg, femur 2.1 mm., tibia 2.4 mm.

Rostrum and palpi dark brownish-black. Antennae dark brown, the flagellar segments oval, densely clothed with an erect pale pubescence. Head dark, sparsely dusted with grey.

Pronotum with the scutum dark, dusted with grey, the scutellum clear yellow on the sides, infumed medially above. Mesonotum black, dusted with grey; scutellum broad, the apical third conspicuously dull yellow. Pleura dark, sparsely dusted with grey. Halteres brown. Legs with the coxae small, dull yellowish-brown; trochanters pale brown; fore femora dark brown except the extreme bases, which are paler; tibiae and tarsi dark brown; middle and hind legs similar but the femora brown, darkened at the tips. Wings greyish subhyaline; stigma indistinct; veins dark brown, slender and very distinct; extreme base of wing yellowish. Venation (Plate III, fig. 10):  $Sc_2$  not greatly removed from the tip of  $Sc_1$ ;  $r$  present, connecting  $R_2$  some distance beyond the fork of  $R_{2+3}$ ;  $R_{2+3}$  moderately long, a little longer than  $r-m$ ;  $Rs$  long, straight; basal deflection of  $R_{4+5}$ ,  $r-m$  and the deflection of  $M_{1+2}$  short, in alignment; cell 1st  $M_2$  open by the atrophy of  $m$ ; basal deflection of  $Cu_1$  inserted at or slightly beyond mid-length of vein  $M_3$ ; second anal vein straight. In its general features the venation suggests *E. laticeps*, Alex., or *E. pilipennis*, Alex. (Western United States). The condition of the second anal vein is more like the subgenus *Acyphona*, and this group of species may be considered as belonging there, although the appearance of the species is quite different from typical *Acyphona*.

Abdomen dark brownish-black, the pleural region yellowish. Hypopygium dull brownish-yellow, the valves blunt. In the unique

specimen at hand I cannot determine the sex without dissection. From the genitalia of the dried specimen it does not seem to be a male, but the fleshy valves are quite different from the usual type of ovipositor in the genus *Erioptera*, more resembling the condition in *Cylindrotoma*, *Styringomyia*, some *Tipula*, etc. With this statement I have discussed the specimen above as being a female.

*Habitat*.—South Africa.

Holotype, ♀?, Ceres Division, Matroosberg, altitude 3500 ft., January, 1917 (R. M. Lightfoot).

Type in the South African Museum.

*Erioptera claripennis* is related to *E. nigrolatera*, Alex. (Ann. Mag. Nat. Hist., ser. 9, vol. 6, p. 31, 1920) of Nyasaland, described since the above was written.

#### ERIOPTERA (ERIOPTERA) FUMIPENNIS, sp. n.

Coloration medium brown, the abdomen darker; wings strongly infumed; cell 1st  $M_2$  open by the atrophy of  $m$ ; basal deflection of  $Cu_1$  before the fork of  $M$ ; second anal vein slightly sinuous near its tip.

*Female*.—Length 4.2 mm.; wing 4 mm.; hind leg, femur 3 mm., tibia 3.1 mm.

Rostrum light yellowish-brown; palpi short, dark brown, the segments with long black setae, the fourth segment at the apex with three very long setae. Antennae moderately elongated, dark brown, the first flagellar segment a little paler; segments of the flagellum elongate-oval with moderately long black verticils. Head brown.

Pronotum prominent, brown, the lateral portions of the scutum and scutellum more yellowish; sides of the pronotal scutum with several long, coarse bristles. Mesonotal praescutum brown, without stripes; pseudosutural foveae conspicuous, dark brown; tuberculate pits about on a level with the cephalic ends of the foveae, separated from one another by a distance about equal to one and one-half times the diameter of one; a few setae on the praescutal interspaces, including two long ones cephalad of the foveae; remainder of the mesonotum brown. Pleura pale brown, the mesepipleura a little more yellowish. Halteres brownish-yellow, the knobs darker, elongate and very large. Legs with the coxae and trochanters brown; remainder of the legs light brown. Wings with a strong brownish-grey suffusion; stigma indistinct; veins dark brown. The veins, with the exception of  $r$ ,  $r-m$  and the basal deflection of  $Cu_1$ , are provided with long black setae. Venation:  $Sc$  moderately long, ending just before the fork of  $R_2+3$ ;  $Sc_2$  very far removed from the tip of  $Sc_1$ , only a short distance beyond the origin of the long, straight sector;  $R_2+3$  moderately long, about

equal to  $r-m$ ;  $r$  on  $R_2$ , the distance on  $R_2$  between it and the fork of  $R_2+3$  a little less than  $r-m$ ;  $r-m$  a little more distad than the basal deflection of  $R_4+5$ ; basal deflection of  $Cu_1$  inserted a short distance before the fork of  $M$ , this distance varying from a little shorter to a little longer than  $r$ ; fusion of  $M_3$  and  $Cu_1$  a little longer than the basal deflection of the latter; 2nd  $A$  long, almost straight, on the distal fourth slightly sinuated as in the subgenus.

Abdomen uniform dark brown with numerous coarse setae; ovipositor yellowish-brown, long, the tergal valves longest, moderately curved, the margins smooth; sternal valves short, very slightly curved to almost straight, the tips acute.

*Habitat*.—South Africa.

Holotype, ♀, Lydenburg, Transvaal (P. Kroeger).

Type in the South African Museum.

A teneral male from Krantzkop, Natal, November, 1917 (K. H. Barnard), is somewhat injured, but agrees in all essentials with the type female above described. It may be considered as being the allotype.

#### GEN. MOLOPHILUS, Curtis.

1833. British Entomology, p. 444.

#### MOLOPHILUS ERIOPTEROIDES, sp. n.

Coloration dark brownish-black, the body heavily dusted with grey; body and wings densely hairy; wings with the anal angle lacking or nearly so;  $R_s$  in alignment with vein  $R_3$ ; basal deflection of  $Cu_1$  before the fork of  $M$ .

*Male*.—Length 1.8 mm.; wing 3.2–3.3 mm.

Rostrum and palpi dark brown. Antennae with the scapal segments large, dark brownish-black, the second segment globular or a little longer than broad; flagellum broken; the condition of the scape would indicate an elongate antenna. Head dark brownish-grey with coarse brownish-yellow hairs; a narrow clear grey line along the inner margin of the eyes.

Praescutum grey, with three broad brownish stripes; remainder of the thorax blackish, heavily dusted with grey. Halteres rather short, the knobs large, dark brown. Legs with the coxae blackish, heavily grey pruinose; trochanters brown; remainder of the legs dark brown. Wings with a faint brown tinge, a little darker in the region of the stigma; veins dark brown. Anal angle of the wings lacking or approximately so, the posterior margin from the base to about mid-length being almost straight. Venation (Plate III, fig. 12):  $Sc_1$  long,

terminating some distance beyond the end of the sector;  $Sc_2$  far removed from the tip of  $Sc_1$ , so that  $Sc_1$  is almost as long as the sector;  $r$  indistinct, inserted on  $R_2$  just beyond its origin;  $Rs$  in a straight line with  $R_3$ ;  $R_2$  strongly arcuated at origin;  $r-m$  a little longer than the deflection of  $R_4+5$ ; cell 1st  $M_2$  open by the atrophy of  $m$ ; basal deflection of  $Cu_1$  before the fork of  $M$ ; fusion of veins  $M_3$  and  $Cu_1$ , *i. e.* the petiole of cell  $M_3$ , about one-third the length of the cell; second anal vein short, ending opposite the basal portion of the sector.

Abdomen dark, sparsely dusted with grey; hypopygium somewhat paler brown.

*Habitat*.—South Africa.

Holotype, ♂, Hottentot-Hollands Mts., 4000 ft., Caledon, Cape Colony, 1917 (K. H. Barnard).

Type in the South African Museum.

This small fly is of considerable interest. It presents many features in agreement with the Seychelles *Tasiocera minutissima*, Edwards, but is a rather larger fly.  $Sc_2$  is present, though far retracted. The principal character given to separate *Molophilus* from *Erioptera* is the fact that the sector apparently ends in cell  $R_2$ , whereas in *Erioptera* it ends in cell  $R_3$ . In the present insect the sector is in direct alignment with vein  $R_3$  and consequently does not end in any cell. This feature is approximated by some *Molophilus (ursinus)* from Eastern North America.

#### GEN. TRIMICRA, Osten Sacken.

##### TRIMICRA INCONSPICUA, Loew.

The following additional records are at hand:

♂ ♀, Cape Town, Cape Colony, September, 1913 (L. Péringuey).

♂ ♀, Knysna, Cape Colony, October, 1916 (L. Péringuey).

♂ ♀, Barberton, Transvaal, May 8th–15th, 1913 (H. K. Munro).

♂ ♂, Junction of the Crocodile and Marico Rivers, Transvaal, February, 1918 (R. Tucker).

♂ ♂, Maritzburg, Natal, December 18th, 1917 (S. G. Rich).

As stated in my earlier paper, it seems probable that this species is the same as *Limnobia lanuginipes*, Walker; two of the above specimens are almost as large as the figures given for *lanuginipes* (male, length 8.5 mm.; wing 10.5 mm.). Moreover it is probable that both of the names above used are synonyms of *Limnobia capensis*, Macquart, the description of which agrees very well with the present insect. The various types should be consulted, if possible, before any positive statement of synonymy is made.

## SUB-GEN. TRICHOTRIMICRA, sub-gen. n.

Antennae with sixteen segments, the flagellar segments gradually narrowed to the end of the organ. Wings with the entire surface pubescent; vein *Sc* rather short, ending about opposite mid-length of the sector; cell 1st  $M_2$  closed, small; legs with the pubescence long but not conspicuous, subappressed.

Type of the sub-genus: *Trimicra* (*Trichotrimicra*) *hirtipennis*, sp. n. (Southern Ethiopian region).

The small fly upon which this new group is based bears a strong resemblance to certain species of the genus *Ormosia*, especially some Holarctic species of the *nigripila* group; this resemblance seems to be due largely to analogy, and the real affinities of the insect to be in the vicinity of *Trimicra*. The comparatively short subcosta and the peculiar structure of the ovipositor will serve to separate this fly from the species of *Ormosia* that resemble it.

## TRIMICRA (TRICHOTRIMICRA) HIRTIPENNIS, sp. n.

General coloration reddish-brown; wings nearly hyaline, the costal region more yellowish; wings covered with a short dense pubescence.

*Female*.—Length about 3.3 mm.; wing 4.8 mm.

Rostrum light yellow; palpi dark brown. Antennae pale brownish testaceous, the flagellar segments cylindrical, covered with a long, coarse, pale pubescence and sparse black verticils; flagellar segments becoming more slender and a little longer toward the end of the organ. Head pale brownish-yellow, with long erect hairs.

Pronotum pale, on either side a little tumid, and here provided with a tuft of from eight to ten very long yellow hairs. Mesonotal praescutum uniform reddish-brown, the lateral margins narrowly whitish; interspaces with long erect yellowish hairs; pseudosutural foveae pale; tuberculate pits rather large, located almost on a level with the foveae, separated from one another by a distance that varies from a little less than the diameter of one to nearly twice this distance: scutum dark brown; scutellum brown, broadly margined caudally with yellowish testaceous; postnotum brown, very sparsely pruinose. Pleura reddish-brown, sparsely grey pruinose. Halteres with the stem yellow, the knobs brown. Legs with the coxae and trochanters very pale yellow, provided with long yellow hairs; femora and tibiae yellow, the pubescence long but subappressed; tarsi pale, the terminal segments darker. Wings hyaline, the costal region pale yellow; stigma indistinct; veins brown, *C*, *Sc* and *R* pale; a rather dense pubescence in all the cells of the wing. Venation: *Sc* short, ending opposite or very slightly

beyond mid-length of the sector;  $r$  on  $R_2$  just beyond the fork; cell 1st  $M_2$  small, about as long as the basal deflection of  $Cu_1$ , which is inserted at the fork of  $M$ .

Abdominal tergites pale brown, sternites yellow. Ovipositor with the tergal valves very slender, almost acicular, subfleshy, delicately pubescent, slightly upcurved before their tips; sternal valves pale, very flattened and compressed, approximately as long as the tergal valves.

*Habitat*.—South Africa.

Holotype, ♀, Krantzkop, Natal, November, 1917 (K. H. Barnard).

Paratopotype, ♀.

Type in the South African Museum.

#### GEN. PLATYLIMNOBIA, Alexander.

##### PLATYLIMNOBIA PUMILA, sp. n.

Size small (male, length 2.6 mm.); general coloration brownish-black including the hypopygium; antennae with but nine flagellar segments, the last more elongated than the others.

*Male*.—Length, 2.6 mm.; hind leg, femur 2.8 mm., tibia 3.2 mm.

Rostrum and palpi dark. Antennae black; scapal segments large; flagellar segments (Plate IV, fig. 22) nine in number, oval-cylindrical, rather crowded, the terminal segment a little narrowed, elongate, about as long as the two preceding taken together. Head with the eyes small, widely separated; ommatidia very coarse. Head dark, sparsely dusted.

Thorax dark, dusted with grey. Pleura paler. Legs with the coxæ and trochanters rather light yellowish-brown, especially the posterior pair; remainder of the legs black.

Abdomen dark brownish-black; hypopygium large, black.

*Habitat*.—South Africa.

Holotype, ♂, Hottentot-Hollands Mts., Caledon, Cape Colony, 1917 (K. H. Barnard).

Type in the South African Museum.

This interesting species is undoubtedly related to the genotype, *Platylimnobia barnardi*, Alexander, but is only about one-half as large (in *barnardi* the middle leg shows the following measurements: femur 6.4 mm., tibia 6 mm.) and almost entirely blackish in colour. The antennae are but 11-segmented. In the material of *P. barnardi* I believed that I could distinguish 16 segments, there being 14 flagellar segments; the material has since been returned to the South African Museum and I cannot confirm the statement at this time, but would indicate the possibility of a mistaken observation. *P. barnardi* has the

abdomen light yellowish-brown, including the hypopygium, in the male with a dark brown subterminal ring on segment 8 and the end of segment 7.

GEN. PODONEURA Bergroth.

PODONEURA ANTHRACOGRAMMA, Bergroth.

The following additional distribution is shown in the material available for study:

♀, Cape Town, Cape Colony, January, 1918 (Cowper).

♀, Kranskop, Natal, November, 1917 (K. H. Barnard.)

♂, Salisbury, Rhodesia, March 21st, 1901 (F. L. Snow); in the collection of Kansas University.

GEN. GONOMYIA, Meigen.

GONOMYIA (GONOMYIA) SULPHURELLOIDES, sp. n.

Somewhat resembling *G. sulphurella* (O.S.) of the Eastern United States; mesonotum yellow, the praescutum with three dark brown stripes; pleura with two narrow dark brown stripes; legs dull brownish-yellow, the tarsal segments darker; wings greyish; *Sc* ending far before the origin of the sector; cell  $R_2$  very small; cell 1st  $M_2$  narrowed at its inner end.

*Female*.—Length about 4.5 mm.; wing 5.1 mm.

Head broken.

Mesonotum light yellow, the praescutum with three dark brown stripes that are entirely confluent behind; the median area behind the median stripe yellowish; scutal lobes brown, the median area yellow; scutellum dark basally, the apex broadly yellowish; postnotum brown, yellow laterally. Pleura yellow with two narrow dark brown longitudinal stripes, the yellow stripe thus enclosed broad; the dorsal brown stripe begins above the fore coxa and passes just beneath the halteres; the ventral stripe is grey pruinose, and occupies the end of the fore coxa and suffuses the sides of the mesosterna. Halteres pale. Legs with the coxae dull yellow except as described above; trochanters dull yellow; remainder of the legs dull brownish-yellow, only the apical tarsal segments dark brown. Wings with a strong greyish tinge; stigma indistinct, veins dark brown. Venation (Plate III, fig. 11): *Sc* short, ending far before the origin of the sector, this distance about equal to  $r-m$ ; cell  $R_2$  very small as in *G. sulphurella*; cell 1st  $M_2$  narrowed at the inner end; basal deflection of  $Cu_1$  at the fork of  $M$ .

Abdominal tergites brown, the posterior margins of the segments dull yellow; sternites brownish-yellow.

*Habitat*.—South Africa.

Holotype, ♀, Krantzkop, Natal, November, 1917 (K. H. Barnard).  
Type in the South African Museum.

GONOMYIA (GONOMYIA) MIMETICA, sp. n.

Related to *G. subcinerea* (O.S.) of the Eastern United States; general coloration grey, the thoracic pleura yellowish, the sternum brownish.

*Male*.—Length about 4.5 mm.; wing 5.2 mm.

Rostrum and palpi black. Antennae black, the terminal flagellar segments elongated. Head dark, greyish pruinose.

Thoracic dorsum grey, the praescutal stripes ill-defined. Pleura yellow, the mesosterna brownish. Halteres long, pale, the knobs a little darker. Legs with the coxae and trochanters dull yellow; remainder of the legs pale brown, the tarsi darker. Wings greyish subhyaline; stigma distinct but rather pale; veins dark brown. Venation (Plate III, fig. 14): *Sc* ending just beyond the origin of the sector; *Rs* long, oblique, a little sinuous before mid-length;  $R_2 +_3$  arcuated; deflection of  $R_4 +_5$  punctiform; cell 1st  $M_2$  closed; basal deflection of  $Cu_1$  at the fork of *M*.

Abdomen dark brown, more yellowish laterally; hypopygium yellow. Male hypopygium with the pleurites moderately elongated, the dorsal angle produced caudad into a rather stout pale lobe that bears a few scattered hairs; ventral pleural appendage a long, slender, pale lobe that is covered with pale hairs; dorsal pleural appendage stout, subcircular, the distal end produced into a short, blunt tubercle that bears a few hairs; the caudal margin is chitinised and produced into a powerful curved hook that bends dorsad and finally slightly cephalad (Plate IV, fig. 23). Penis-guard elongate, compressed, deeply notched beyond mid-length, exceeding the tips of the pleurites; from near its base projects an elongate, slender, heavily chitinised rod that is acutely pointed at its tip.

*Habitat*.—South Africa.

Holotype, ♂, Krantzkop, Natal, November, 1917 (K. H. Barnard).

Paratype, ♂, New Hanover, Natal, November 29th, 1914 (C. B. Hardenberg); Montagu, Cape Colony, October, 1919 (R. W. Tucker).

Type in the South African Museum.

GONOMYIA (GONOMYIA) TUCKERI, sp. n.

Colour brownish-grey, the praescutal stripes rather indistinct; antennae black; legs dark brown; wings with a faint yellowish tinge; *Sc* long, extending to opposite mid-length of *Rs*; cell 1st  $M_2$  open by the atrophy of the outer deflection of  $M_3$ ; basal deflection of  $Cu_1$  far before the fork of *M*.



*Sex?*. Wing, 6·4 mm.

Rostrum and palpi dark brownish-black. Antennae black, the flagellar segments long-oval. Head grey, more reddish along the inner margin of the eye.

Mesonotum brownish-grey, the praescutum with the stripes indistinct; scutellum yellow, dark brown anteriorly. Pleura pale greyish-white, indistinctly marked with darker blotches. Halteres pale. Legs with the coxae dull yellow, the outer face more brownish; trochanters dull yellow; remainder of the legs dark brown, darkest on the tarsi. Wings with a faint yellow tinge, the stigma indistinct; veins pale yellowish-brown, the costal veins more yellowish. Venation:  $Sc_1$  elongate, ending just beyond mid-length of the long, arcuate sector;  $Sc_2$  retreated, located just before the origin of  $R_s$ ;  $R_2 +_3$  long, gently arcuated;  $R_2$  oblique; cell  $R_2$  large; cell 1st  $M_2$  open by the atrophy of the outer deflection of  $M_3$ ; cell  $M_2$  deep; basal deflection of  $Cu_1$  far before the fork of  $M$ , the fusion with  $M$  greater than the deflection alone.

Abdomen broken beyond the first segment.

*Habitat*.—South Africa.

Holotype, sex?, Komati Poort, Eastern Transvaal, November, 1918 (R. W. Tucker).

Type in the South African Museum.

In its venation *G. tuckeri* agrees almost exactly with *G. mathesoni*, Alex. (North-eastern North America). In both species  $Sc_2$  is retreated far back from the tip of  $Sc_1$  so that it lies just proximad of the origin of the sector. Such species would run to the tribe Pediciini in the keys to the family.

This interesting fly is dedicated to its collector, Mr. R. W. Tucker.

#### GONOMYIA (GONOMYELLA) FLAVEOLA, sp. n.

Front yellow, vertex dark grey; thorax yellow, the praescutum with three dark brown stripes; legs largely yellow, the tips of the femora and tibiae darkened; wings tinged with yellow;  $Sc$  long; basal deflection of  $Cu_1$  just before the fork of  $M$ .

*Female*.—Length, 5·8–6·3 mm.; wing, 6–6·5 mm.

Rostrum and palpi dark brown. Antennae with the basal segments yellowish, the remainder of the organ dark brown; flagellar segments oval. Front dull yellow; vertex dark grey pruinose.

Thorax yellow, the praescutum with three dark brown stripes that are confluent behind; pseudosutural foveae large, conspicuous, triangular, shiny dark brown; scutum with the lobes largely dark; scutellum dull brownish-yellow; postnotum dark brown, the sides more yellowish.

Pleura dull brownish-yellow. Halteres short, yellow. Legs stout, the coxae and trochanters dull yellow, femora and tibiae dull yellow, narrowly tipped with dark brown; tarsi brown, darkest on the terminal segments. Wings with a strong yellow tinge; stigma indistinct; veins yellow and brownish-yellow, brightest at the base of the wing and in the costal area. Venation (Plate III, fig. 13):  $Sc$  long, ending at about two-thirds the length of the sector;  $Sc_2$  removed to some distance from the tip of  $Sc_1$ ;  $Rs$  very long, almost straight;  $r$  inserted at about mid-length of the short  $R_2 +_3$ ; cell 1st  $M_2$  open by the atrophy of the outer deflection of  $M_3$ ; in a paratype the  $m$  cross-vein is likewise atrophied, leaving the end of  $M_3$  suspended in the membrane; basal deflection of  $Cu_1$  before the fork of  $M$ .

Abdominal tergites brown or yellowish-brown, the posterior margins of the segments broadly ringed with dull yellow; sternites yellow, the segments narrowly and indistinctly ringed with paler.

*Habitat*.—South Africa.

Holotype, ♀, Knysna, Cape Colony, October, 1916 (L. Péringuey).

Paratopotypes, two ♀ ♀.

Type in the South African Museum.

This species is most closely allied to *G. natalensis*, Alex., but is readily told by the diagnostic characters given above.

#### GONOMYIA (GONOMYELLA) PULCHRISSIMA, sp. n.

Black; pleura yellow with two black stripes; abdominal tergites banded with brown and yellow; wings subhyaline, cell  $R_2$  deep, tip of vein  $M_3$  hanging free in the membrane.

*Male*.—Length 3.4 mm.; wing, 2.3 mm.

Rostrum and palpi black. Antennae black; second scapal segment enlarged ovate; flagellar segments oval-cylindrical, the verticils short. Head black.

Pronotum dark brownish-black, the lateral margin narrowly bright yellow. Mesonotal praescutum shiny black, conspicuously margined with bright yellow; scutum black, the lobes with a yellow spot on the lateral posterior margin; scutellum and postnotum black. Pleura clear yellow, with a broad black dorsal pleural stripe extending from the posterior margin of the pronotum caudad beneath the wing root to the postnotum; conspicuous black marks on the mesosternum between the fore and middle coxae. Halteres dark brown, the base of the stem yellow. Legs with the coxae dull yellow, the outer face purplish brown, especially basally; trochanters blackish; femora light brown the bases more yellow, the apices darkest; tibiae brown, the tips darker; tarsi dark brown. Wings subhyaline, the veins brown.

Venation: *Sc* rather long, extending to beyond one-third the length of the long sector; *r* rather indistinct, connecting with  $R_2$  just beyond the base; cell  $R_2$  very deep; tip of vein  $M_3$  lying free in the membrane, the basal connections atrophied; if it were connected with vein *Cu* (as in *G. brevifurca*) the fork would be very deep, there being about ten equidistant macrotrichiae on the preserved portion of  $M_3$ .

Abdominal tergites pale reddish-brown, broadly margined caudally and laterally with yellow; hypopygium jet black, the ninth tergite with a yellow dorsal semi-lunar mark at the base and a less distinct mark on either side; sternites light yellow. Hypopygium suddenly narrowed, small, its general structure somewhat as in *G. brevifurca*; ninth tergite narrow, with a profound median split, the lateral lobes very slender, slightly down-curved, covered with a short pubescence; ninth pleurite produced caudad into a slender finger-like lobe; three pairs of appendages project from a genital chamber, most of which seem to be pleural appendages; the longest pair are apparently attached to the sternite, are flattened basally, light brown, the tips slightly curved and blackened, near the base on the outer face with a short spine; the other spines are shorter and are more pleural in position.

*Habitat*.—South Africa.

Holotype, ♂, French Hoek, Cape Colony, altitude 2500–3600 ft., December 4th, 1916 (K. H. Barnard).

Type in the South African Museum.

This beautiful crane-fly is very similar in its general appearance to *G. brevifurca*, Alexander, but is readily told by the venation and details of body coloration, as diagnosed above.

#### GEN. TRENTÉPOHLIA, Bigot.

1854. Ann. Soc. Ent. France (3rd ser.), vol. 2, p. 473.

(This genus was not used in Part I of this series, *Mongoma*, Westwood, being substituted. However, *Trentépohtia* is the older name, and there seems to be no just reason for not adopting it.)

TRENTÉPOHLIA (TRENTÉPOHLIA) SPEISERI HUMERALIS, subsp. n.

Mesonotum dark brownish-black, the humeral angles of the praescutum reddish; legs brown; wings with the subhyaline spot in cell  $R_2$  very small.

*Male*.—Length about 7.6 mm.; wing 6.4 mm.

*Female*.—Length about 7.3 mm.; wing 6.8 mm.

Mouth-parts, including the well-developed maxillary and labial palpi,

dark brown. Antennae dark brown throughout. Head black with a grey pruinosity.

Neck distinct, black. Prothorax black. Mesonotal praescutum dark brownish-black, the extensive humeral areas dull reddish, delimited behind by a broad shallow suture; the broad median black stripe extends to the anterior margin of the sclerite. Remainder of the mesonotum, including the pleura, dark brownish-black. Halteres pale, the knobs large. Legs with the fore and middle coxae brownish, the posterior coxae more yellow on the outer face; fore trochanters brown, the other trochanters dull yellow; femora and tibiae dark brown, slightly paler basally; tarsi dark brown. Wings with the broad costal area yellowish, the remainder of the wing grey; a broad dark brown wing apex passing through the fork of  $R_2+3$  and the fork of  $R_4+5$  and  $M_1+2$ , paler in the posterior cells; a small, subhyaline, rounded spot in cell  $R_2$  adjacent to the tip of  $R_2$  and costa, not reaching vein  $R_3$ ; a broad dark brown seam along the cord, on the cephalic portion greatly broadened into a solid subquadrangular costal area; a broad brown seam along  $Cu$ ; veins yellow, brown in the darkened areas. Venation: similar to typical *speiseri* as figured by Edwards, but the fusion of  $R_4+5$  and  $M_1+2$  longer, exceeding  $Rs$ .

Abdomen dark brownish-black. Ovipositor black with the valves rusty, the dorsal valves very short and curved as in this group of species.

*Habitat*.—South Africa.

Holotype, ♂, Kaapmuiden, Eastern Transvaal, October 30th, 1918 (R. W. Tucker).

Allotopotype, ♀.

Paratopotypes, 2 ♂ ♀, June 10th–23rd, 1919 (H. K. Munro).

This handsome fly will probably be found to be a valid species, but for the present the writer prefers to consider it a race of *T. speiseri*, Edwards. From the type species it differs notably in the large size and darker colour throughout, especially the thoracic pattern, where black has largely replaced the reddish-brown areas, and in the darker legs and wings.

TRENTEPOHLIA (TRENTEPOHLIA) GRACILIS CONTINENTALIS, subsp. n.

*Male*.—Wing 6·5 mm.

*Female*.—Length 9·4 mm.; abdomen 7·5 mm.; wing 6·7 mm., its greatest width 1·05 mm.

This species differs from the description of typical *gracilis*, End. (Madagascar), as follows: wings longer and narrower, proportionate to the length of the body. Mesonotal praescutum dull brownish-grey

with a broad dark brown median stripe, broadest in front, narrowed behind, ending at the suture. Halteres not elongate. Abdomen dark brownish-black, the ovipositor deep rusty.

The mouth-parts, in addition to the moderately elongate maxillary palpi, possess conspicuous bi-articulate labial palpi, the distal segment of which is more than twice the length of the basal segment, suddenly narrowed at its apex and provided with a few sensory bristles; the inner face of this segment is nearly glabrous, the outer face with numerous short, appressed, bristle-like setae.

Male hypopygium small, the pleurites stout; pleural appendage slender, at about mid-length deeply incised, basad of the incision with a small finger-like lobe; the distal blade of the appendage with a conspicuous flattened wing along the inner margin, this bearing two setigerous punctures; at the apex of the appendage are a few additional setae. Gonapophyses widely separated at their insertion, inclined toward one another, each one at its distal end expanded into a flattened blade that is apically subtruncate.

*Habitat*.—South Africa.

Holotype, ♀, Kaapmuiden, Eastern Transvaal, October 30th, 1918 (R. W. Tucker).

Allotopotype, ♂.

Paratopotype, sex?

Type in the South African Museum.

GEN. CONOSIA, van der Wulp.

CONOSIA IRRORATA, Wiedem., var.

Three specimens from Waterberg, Damara Land, February, 1920 (R. W. Tucker).

These specimens are smaller and more greyish than typical forms, but it seems probable that these features are due to environmental factors. The species is probably the most widely distributed crane-fly known, occurring over practically the entire African continent, thence eastward to Australia, north to Palestine and Japan.

### TRIBE LIMNOPHILINI.

GEN. LIMNOPHILA, Macquart.

LIMNOPHILA FRUGI, Bergroth.

The following additional distribution:

♂ ♂, Pretoria, Transvaal, April 5th, 1913 (H. K. Munro).

♂ ♂, M'fongosi, Zululand, April, May, 1916; February, 1917 (W. E. Jones).

## LIMNOPHILA SPECTABILIS, sp. n.

Antennae black, the first segment of the flagellum yellowish; wings subhyaline, with an extensive pale grey pattern.

*Male*.—Length 7.2 mm.; wing 8.8 mm.

Rostrum and palpi black. Antennae moderately elongated, black, the first flagellar segment yellowish; flagellar segments elongate-oval. Head dark brown.

Pronotum dull brownish-yellow. Mesonotum dull brown, discoloured in the type, scutellum more yellowish. Pleura dull brownish-yellow with a broad dark brown stripe extending from the cervical sclerites backward. Halteres yellowish, the base of the knob brown. Legs with the coxae and trochanters dull yellow; femora and tibiae dull brown, the tips a little darker; tarsi brown. Wings subhyaline, extensively suffused with pale greyish-brown clouds and broad seams as follows: Base of the wing, origin of the sector, along the cord and outer end of cell 1st  $M_2$  and at the ends of the longitudinal veins; veins dark brown. Venation (Plate III, fig. 5):  $Sc$  extending to beyond the end of the sector;  $Sc_2$  at the tip of  $Sc_1$ ;  $r$  at the tip of  $R_1$ ;  $R_2+3$  rather short, somewhat arcuated; petiole of cell  $M_1$  about one-third to one-half the length of the cell; basal deflection of  $Cu_1$  just before the middle of cell 1st  $M_2$ .

Abdominal tergites dark brown; sternites with the basal third of the segments brownish, the remainder dull yellowish; hypopygium dark.

*Habitat*.—South Africa.

Holotype, ♂, Maritzburg, Natal, 1917 (K. H. Barnard).

Type in the South African Museum.

## LIMNOPHILA MEDIALIS, sp. n.

Related to *L. frugi*, Bergr.; first flagellar segment dark brown with only the base yellowish; wings brown with a sparse brown pattern at the origin of the sector and along the cord.

*Female*.—Length 7.8 mm.; wing 8 mm.

Rostrum and palpi dark brown. Antennae dark brown, basal third or less of the rather long first segment of the flagellum light yellow; remaining segments of the flagellum elongate-oval, the organ being rather long for this sex. Head dark, pruinose.

The thorax is discoloured in the unique type, and the colour of the pollen cannot be described. Pronotum brownish-yellow. Mesonotum dark brown. Pleura yellowish-brown, with a broad dark brown longitudinal stripe extending from the cervical sclerites to beyond the base of the abdomen. Halteres dark brown, pale at the base. Legs with the coxae and trochanters dull yellow, the remainder of the legs broken.

Wings with a strong brownish suffusion; darker brown clouds as follows: at the origin of  $R_s$ , along the cord, at the stigma; smaller markings at the outer end of cell 1st  $M_2$  and at the forks of  $R_2+3$  and  $M_1+2$ . Venation: similar to *L. frugi*, but  $r$  closer to the tip of  $R_1$ ; deflection of  $R_4+5$  almost in alignment with  $r-m$ ; petiole of cell  $M_1$  shorter; basal deflection of  $Cu_1$  beyond mid-length of cell 1st  $M_2$ .

Abdomen dirty yellow, more brownish along the lateral margins of the segments. Ovipositor rusty, very long and slender.

*Habitat*.—South Africa.

Holotype, ♀, Oudebosch, Caledon, Cape Colony, altitude 1500 ft., January, 1919 (K. H. Barnard).

Type in the South African Museum.

*L. medialis* is similar to *L. spectabilis*, but is much smaller, *Sc* ending opposite the fork of the very long sector, the wings brown, with a pattern that is darker but not nearly so extensive as in *L. spectabilis*.

#### LIMNOPHILA NATALENSIS, sp. n.

Coloration light yellowish-brown, the thoracic stripes indistinct; abdomen of the male with a black ring on segment 8; wings pale brown;  $r$  at the tip of  $R_1$ ; cell  $M_1$  deep; basal deflection of  $Cu_1$  beyond mid-length of cell 1st  $M_2$ .

*Male*.—Length 6.3 mm.; wing 7.8 mm.

Rostrum and palpi dark brown. Antennae moderately elongated. dark brown, the scapal segments light brown; flagellar segments elongate-oval. Head brown.

Thorax light yellowish-brown, the usual three praescutal stripes indistinct. Pleura dull brownish-yellow. Halteres light brown, the knobs darker. Legs with the coxae and trochanters dull yellow; femora yellowish-brown; tibiae and tarsi dark brown. Wings evenly suffused with pale brown; stigma indistinct, slightly darker brown; veins dark brown. Venation (Plate III, fig. 6): *Sc* extending to beyond the end of the sector;  $r$  at the tip of  $R_1$  and inserted at about mid-length of  $R_2$ ;  $R_s$  moderately elongated, arcuated at origin;  $R_2+3$  long, arcuated; cell  $M_1$  deep, more than twice the length of its petiole; cell 1st  $M_2$  long; basal deflection of  $Cu_1$  at about two-thirds the length of cell 1st  $M_2$ .

Abdominal tergites dull brownish-yellow, the lateral margins brown; a black subterminal ring; sternites dull testaceous yellow, the eighth segment black; hypopygium yellow.

*Habitat*.—South Africa.

Holotype, ♂, Maritzburg, Natal, 1917 (K. H. Barnard).

Paratopotype, ♂.

Type in the South African Museum.

This fly agrees closely with the rather insufficient description of *L. claduroneura*, Speiser (Kilimandjaro)—a somewhat larger fly, with the petiole of cell  $M_1$  still shorter, only about one-fourth the length of the cell itself.

*LIMNOPHILA GRISEICEPS*, sp. n.

Related to *L. natalensis*; head light grey; antennae elongate, black; wings greyish-brown, the costal region a little darker; subcosta long, basal deflection of  $R_4+5$  very short.

*Female*.—Length 9.4 mm.; wing 10 mm.

Related to *L. natalensis*, sp. n., differing as follows: size larger; head clear light grey, not reddish-brown as in *natalensis*, the eyes much closer together at the vertex. Antennae black, the first scapal segment grey pruinose; the flagellar segments very long and slender, so the antenna is considerably longer than in the males of *natalensis*—the only sex of this latter species yet made known. Thoracic notum dark brown, brightened only on the humeral region of the praescutum and the caudal half of the postnotum, which are more reddish. Wings darker, especially cell *C*, which is brownish. Venation:  $Sc_2$  longer than  $Sc_1$  and entering *R* slightly before the fork of  $R_2+3$ ; *Rs* longer and less arcuated at origin; basal deflection of  $R_4+5$  very short to almost obliterated, *r-m* being correspondingly longer; petiole of cell  $M_1$  shorter; cell 1st  $M_2$  broader.

*Habitat*.—South Africa.

Holotype, ♀, Oudebosch, Caledon, Cape Colony, altitude 1500 ft., January, 1919 (K. H. Barnard).

Type in the South African Museum.

*LIMNOPHILA RHODESIAE*, sp. n.

Related to *L. frugi* (Bergr.); the first flagellar segment yellow; thoracic pleura with a broad silvery stripe; wings with a delicate pale brown dotting along the veins and at the wing margin; *Rs* angulated and spurred at origin; cell 1st  $M_2$  small, subquadrate.

*Male*.—Length about 6.5 mm.; wing about 7 mm.

Rostrum and palpi dark brown; antennae dark brown, the second scapal segment paler brown; the first flagellar segment light yellow; first scapal segment very long; flagellar segments beyond the fourth slender, elongate-cylindrical. Head dark with a heavy yellowish-grey bloom, an indistinct brown longitudinal mark on the vertex; head strongly narrowed behind as in this subgenus (*Pseudolimnophila*, Alex.).

Pronotum conspicuous, grey, with a narrow brown dorso-medial line.



Mesonotal praescutum greyish-yellow with three dark brown stripes, the median one narrowed to the transverse suture; lateral stripes narrow. Pseudo-sutural foveae very conspicuous, semi-circular, black, shiny. Remainder of the mesonotum greyish-yellow, pruinose, the scutal lobes darker. Pleura dark brown, a conspicuous broad silvery grey stripe across the mesopleura, extending from the fore coxae to above the base of the middle coxae. Mesosternum dark brown, more or less silvery-grey pruinose. Halteres pale at base, the knobs brown. Legs with the coxae pale, grey pruinose; trochanters yellow; remainder of the legs broken. Wings with a faint grey tinge, the membrane heavily dotted with brown along the veins and outer margin. The pattern is as follows: larger and darker brown marks at the origin of *Rs*, at about mid-length of *R*, where there are three confluent dark brown spots in cell *Sc*, the tip of *Sc*<sub>1</sub> and presumably at the tip of *R*<sub>1</sub>; this region of the wing injured in the unique type; paler brown dots along the veins and at regular intervals along the wing margin, the largest at the ends of the longitudinal veins; in cell *C* the dots are very small, pale and few in number; there are about four dots along *Rs*, about eight along *M*, about twelve very distinct clouds along *Cu* before its fork, seven along 2nd *A*, and about four or five along the margin of the wing in cell 2nd *A*. Veins light brown, costa more yellowish. Venation: *Sc* ending just beyond the fork of *Rs*; *Rs* moderately long, strongly angulated and slightly spurred at its origin; basal deflection of *R*<sub>4+5</sub> about as long, or a trifle shorter than the basal deflection of *Cu*<sub>1</sub>; *r-m* about twice the length of the very short *m*; cell 1st *M*<sub>2</sub> small, subquadrate, about as long as the basal deflection of *Cu*<sub>1</sub>, which is inserted at about the middle of its length; terminal section of *Cu*<sub>1</sub> nearly twice the length of cell 1st *M*<sub>2</sub>; second anal vein strongly curved at its tip.

Abdominal tergites dark brown, the basal sternites more yellowish.

*Habitat*.—South Africa.

Holotype, ♂, Salisbury, Southern Rhodesia, May, 1917 (R. W. E. Tucker).

Type in the South African Museum.

#### LIMNOPHILA NOX, sp. n.

General colour brown; legs, halteres and wings blackish; wings with *r* rather indistinct; cell *R*<sub>2</sub> sessile or nearly so; petiole of cell *M*<sub>1</sub> very long; basal deflection of *Cu*<sub>1</sub> beyond the fork of *M*.

*Male*.—Length 4.3 mm.; wing 4.9 mm.

Rostrum and palpi black. Antennae short, black; basal flagellar segments subglobular, enlarged, broader than long, the terminal

flagellar segments slender, elongated, with long black bristles. Head broad, dark brown.

Thorax discoloured in the type, probably dark brown. Halteres short, black. Legs black. Wings dark brownish-black; veins dark brown. Venation (Plate III, fig. 7):  $Sc$  extending to just before the end of the sector;  $r$  rather indistinct; cell  $R_2$  very deep, almost sessile; deflection of  $R_4 + 5$  long, nearly twice the length of  $r-m$ ; cell  $M_1$  very short, from one-third to two-fifths the length of its petiole; basal deflection of  $Cu_1$  beyond the fork of  $M$ .

Abdomen black, the hypopygium a little brighter.

*Habitat*.—South Africa.

Holotype, ♂, Ceres Division, Matroosberg, Cape Colony, altitude 3,500 ft., November, 1917 (Lightfoot).

Paratype, ♂, Paarl, Cape Colony, October, 1919 (Rev. G. Hawke).

A paratype specimen from French Hoek, Cape Colony, altitude 2500–3600 ft., December 4th, 1916 (K. H. Barnard) is larger than the type, offering the following measurements: length about 5.3 mm.; wing 5.8 mm. As the coloration is better preserved than in the somewhat defective type the following additional notes are given.

First scapal segment of the antennae long, the second nearly globular. Pronotum very large and generalised in structure, the scutellum constricted medially and with a deep impressed median groove. Mesonotal praescutum dark brown with a sparse brownish-yellow pollen and with a broad dark brown median stripe that is broadest in front, becoming obliterated before the suture; pseudo-sutural foveae very large and conspicuous, shiny black; tuberculate pits lacking or else very reduced. Pleura grey pruinose. The wing coloration and venation is almost exactly as in the type;  $Sc_2$  a short distance from the tip of  $Sc_1$ . Abdomen brownish-grey pruinose. Male hypopygium with the pleurites short and stout, the two pleural appendages relatively small, the outer appendage a little longer but narrower than the fleshy inner appendage. Penis-guard slender, almost straight; gonapophyses with the tips slender, acute.

#### SUB-GEN. LIMNOPHILOMYIA, sub-gen. n.

Labium triangular, pointed. Antennae elongate, 16-segmented, the flagellar segments with short subbasal verticils. Tibial spurs microscopic or lacking. Wings with the radial cross-vein lacking;  $Sc_2$  elongate; basal deflection of  $R_4 + 5$  in a direct line with the sector. Male hypopygium simple.

Type of the sub-genus: *Limnophila* (*Limnophilomyia*) *lacteitarsis*, sp. n. (Southern Ethiopian region).

In the characters of the loss of *r* and the reduction or loss of the tibial spurs this group suggests *Phyllolabis*, O.S., of the northern Holarctic region.

LIMNOPHILA (LIMNOPHILOMYIA) LACTEITARSIS, sp. n.

General coloration, including the wings and halteres, brownish-black; legs black, the tips of the posterior tarsi creamy-white; antennae of the male elongated; tibial spurs microscopic or lacking; wings with *r* and cell  $M_1$  lacking, the deflection of  $R_4+5$  in direct alignment with the radial sector.

*Male*.—Length 7 mm.; wing 7.7 mm.; hind leg, femur 7.3 mm., tibia 7.1 mm.; antenna about 4.3 mm.

Frontal prolongation of the head very short, light brown, running cephalad into a shiny chitinised median point. Lower lip triangular, pointed. Palpi dark brown. Antennae of the male 16-segmented, dark brownish-black; the organ is elongated, about equal to twice the length of the combined head and thorax; scapal segments small, the flagellar segments greatly elongated, the first segment longest, the remaining segments gradually shortened to the end of the organ; flagellar segments cylindrical, densely clothed with a rather long blackish pubescence and with a few short verticils. Head broad, dark brown. Eyes contiguous beneath, the ommatidia coarse.

Mesonotum dark brown, the praescutum a little paler and without distinct stripes. Pleura dark brown. Halteres black. Legs broken, excepting one of the posterior pair; this has the coxa and trochanter brown; femur, tibia and base of the metatarsus black, the apical quarter of the metatarsus creamy white, remainder of the tarsus broken; in the unique specimen at hand the writer cannot detect tibial spurs, and if they are present they are very short and hidden by the rather long apical tibial hairs. Wings with a strong blackish suffusion, the costal and subcostal cells a little darker; stigma indistinct; veins dark brownish-black. Venation:  $Sc_1$  ending about opposite the fork of  $Rs$ ,  $Sc_2$ , projecting considerably beyond, nearly four times the length of  $Sc_1$  alone;  $Rs$  long, almost straight; tip of  $R_1$  indistinct and *r* lacking;  $R_2+3$  strongly angulated at origin; basal deflection of  $R_4+5$  in a straight line with  $Rs$ ; *r-m* a little shorter than the basal deflection of  $M_1+2$ ; cell 1st  $M_2$  small, almost square; cell  $M_1$  lacking; basal deflection of  $Cu_1$  at about two-fifths the length of cell 1st  $M_2$ . Long black setae on vein *R* and all the longitudinal veins beyond the cord, scarce or entirely lacking on the basal portions of *M*, *Cu* and the anal veins.

Abdomen rather long, dark brown, the basal sternites paler.

Hypopygium rather small, the pleurites moderately stout, elongate; the long, slender, yellow pleural appendages lie on the dorsal face of the pleurites, and are subsinuous with the tips bent slightly outward.

*Habitat*.—South Africa.

Holotype, ♂, Oudebosch, Caledon, Cape Colony, altitude 1500 ft., January, 1919 (K. H. Barnard).

Type in the South African Museum.

## TRIBE HEXATOMINI.

### GEN. ERIOCERA, Macquart.

1838. Dipt. Exotiques, vol. 1, pt. i, p. 74.

This interesting genus was supposed to be lacking on the European and African continents, although represented by a few species in Madagascar and the Seychelles. A few species from continental Africa have been described by the writer while the present paper was in press. The two new species described below belong to the section of the genus with elongate male antennae and cell  $M_1$  of the wings lacking—a group typified by *Eriocera longicornis*, Walker (Eastern United States), to which species the new forms are obviously allied.

#### ERIOCERA CAPENSIS, sp. n.

Coloration black; legs and halteres black; wings brown; fork of  $R_2$  shallow; antennae of the male greatly elongated.

*Male*.—Length 7 mm.; wing 8.5 mm.

*Female*.—Length 6.7 mm.; wing 7.2 mm.

Rostrum and palpi dark brown. Antennae of the male enormously elongated, greatly exceeding the body; first scapal segment large, reddish-brown; second segment small cyathiform, black; flagellar segments elongated, black, provided with long delicate hairs and a row of scattered spinous projections. Frontal tubercle enormous, globular, occupying the space between the eyes like a crest. Head dark brownish-black.

Thorax black, sparsely dusted with brownish-grey. Halteres black. Legs black, the coxae, trochanters and base of the femora dark brown. Wings suffused with brown; stigma distinct, darker brown; veins dark brown. Venation (Plate III, fig. 8): *Sc* extending beyond the end of the sector; *r* at the tip of  $R_1$  and inserted on  $R_2 +_3$  just before the fork; cell  $R_2$  not deep; *r-m* and the deflection of  $M_1 +_2$  in alignment; cell  $M_1$  lacking; basal deflection of  $Cu_1$  before, at, or just beyond the fork of  $M$ ;  $Cu_2$  a little shorter than the deflection of  $Cu_1$ .

Abdomen black.

The female is smaller than the male; antennae short; frontal tubercle smaller; valves of the ovipositor blunt (as in *longicornis*).

*Habitat*.—South Africa.

Holotype, ♂, junction of the Crocodile and Marico Rivers, Transvaal, February, 1918 (R. Tucker).

Allotopotype, ♀.

Type in the South African Museum.

ERIOCERA HUMILIS, sp. n.

Coloration brown; legs yellowish-brown with the tips of the femora and tibiae dark; wings pale brown; antennae of the male greatly elongated.

*Male*.—Length 5.6 mm.; wing 7.3 mm.; antennae about 15 mm.

*Female*.—Wing 6 mm.

Similar to *E. capensis*, as described above, but smaller; general coloration brown, the legs dull yellowish-brown with the tips of the femora and tibiae darker; wings pale brown; *Sc* longer; basal deflection of *Cu*<sub>1</sub> beyond the fork of *M* (Plate III, fig. 9).

It will be noted that in this group of species, as well as in a very few other groups of crane-flies, the males are larger than the females.

*Habitat*.—South Africa.

Holotype, ♂, junction of the Crocodile and Marico Rivers, Transvaal, February, 1918 (R. Tucker).

Allotopotype, ♀.

Type in the South African Museum.

SUB-FAMILY TIPULINAE.

TRIBE TIPULINI.

A recent study of the immature stages of crane-flies has shown that the tribe Dolichopezini as used in the first part of this series of papers is scarcely valid, and is now relegated to the synonymy of the *Tipulini*.

GEN. DOLICHOPEZA, Curtis.

SUB-GEN. TRICHODOLICHOPEZA, Alexander.

DOLICHOPEZA (TRICHODOLICHOPEZA) HIRTIPENNIS, Alexander.

A male and a female from Inchanga, Natal, November, 1917 (K. H. Barnard). A male and a female from Krantzkop, Natal, November, 1917 (K. H. Barnard). The wing of the male measures 9.7–9.8 mm.; that of the female 11–11.4 mm. The specimens differ somewhat from the type, but this difference is not sufficient for

separation. The basal flagellar segments are a little pale at the tips; the median praescutal stripe distinctly split by a line of the ground-colour; tip of vein  $R_2$  much better preserved to the wing-margin, etc.

*DOLICHOPEZA* (*TRICHODOLICHOPEZA*) *AURANTIACA*, sp. n.

Head orange; thorax orange with three indistinct brown stripes; wings greyish-yellow; tip of vein  $R_2$  preserved; tarsi brown.

*Male*.—Length 8.8 mm.; wing 9.5 mm.

Frontal prolongation of the head very short, dull yellow; nasus prominent. Palpi dark brown. Antennae moderately elongated, the scape yellow, flagellar segments dark brown, the basal segments a little paler at the tips. Head orange without distinct markings.

Mesonotum brownish-orange, the praescutum with the median stripe very indistinct, obliterated anteriorly, the lateral stripes pale. Pleura orange-yellow. Halteres short, pale, the knobs dark brown, pale at the extreme tips. Legs with the coxae and trochanters pale yellow; femora dark brown, paler basally, almost black at the tips; tibiae and tarsi black. Wings suffused with greyish-yellow, the wing-apex a little darker; stigma large, elongate-oval, dark brown; cord seamed with pale brown; a pale oblitative streak before the cord extending into the base of cell  $M_3$ , and a similar but smaller area beyond the stigma in the end of cell 2nd  $R_1$  and the extreme base of  $R_2$ ; veins dark brown. A heavy pubescence in the apical cells of the wings. Venation (Plate IV, fig. 15): tip of  $R_2$  entirely preserved; fusion of  $M$  and  $Cu_1$  a little shorter than the free portion of  $M$  beyond the fusion.

Abdomen with the two basal tergites orange-yellow; remaining tergites orange-brown, with the caudal margins of the segments narrowly ringed with dark brown; sternites orange-brown, the apical sternites dark brown basally. Male hypopygium with the tergal region margined caudally with a horseshoe-shaped chitinated band that is almost smooth except at the ends of the crescent, which are enlarged and coarsely toothed. In the related *D. hirtipennis* the band is irregularly and finely denticulate or roughened, and above the median or dorsal portion of the crescent is a high, depressed, very flattened ledge whose posterior margin is narrowly chitinated and roughened. The penis-guard and the flattened pleural lobes that lie ventrad of the outer pleural appendages are less conspicuous than in *D. hirtipennis*.

*Habitat*.—South Africa.

Holotype, ♂, Kranskop, Natal, November, 1917 (K. H. Barnard).

Paratype, ♂, Maritzburg, Natal, 1917 (K. H. Barnard).

Type in the South African Museum.

In addition to the characters given above, the species may be told from *D. hirtipennis* by the shorter flagellar segments, the very different pattern to the wings and mesonotum and the general orange-yellow coloration, not buff as in *hirtipennis*.

#### GEN. GONIOTIPULA, gen. n.

Frontal prolongation of the head rather short; nasus distinct. Antennae of the male elongated, apparently but 11-segmented; segments without verticils; first scapal segment shorter than the first flagellar segment, second scapal segment about one-half the length of the first. Halteres long and slender. Legs with the tibial spurs rather small, empodia large. Wings with a long basal petiole, the anal angle practically lacking;  $Sc_1$  lacking, tip of  $R_2$  atrophied; fusion of  $M_3+4$  and  $Cu_1$  extensive, about as long as  $r-m$  alone; the abortive anal vein that lies immediately behind vein  $Cu$  and has been termed the "anal furrow" in literature is here very evident, and almost attains the wing-margin; second anal vein straight, rather long, almost parallel to the anal angle of the wing. Veins with few setae. Male hypopygium with the tergite notched behind, distinct from the sterno-pleurite; eighth sternite unarmed.

Genotype, *Goniotipula cuneipennis*, sp. n. (Southern Ethiopian region).

The genus *Goniotipula* presents some features in common with both *Megistomastix*, Alex. (Neotropical region), and *Leptotipula*, Alex. (Ethiopian region), but cannot be placed with either of these groups by the combination of characters. The elongate antennal flagellum without verticils and the strikingly petiolate wings furnish the principal generic characters.

#### GONIOTIPULA CUNEIPENNIS, sp. n.

Antennae elongate, longer than the combined head and thorax, dark brown, the flagellar segments without verticils; wings long-petiolate, faintly greyish, the tip of vein  $R_2$  atrophied.

*Male*.—Length, 8.6 mm.; wing, 8.5 mm., its greatest width, 1.6 mm.; fore leg, femur about 6.8 mm., tibia, 6.4 mm., tarsus about 8.3 mm.

Frontal prolongation of the head short, stout, light grey, the nasus stout; palpi dark brown, the last segment nearly equal to the second and third combined. Antennae of the male elongated, considerably longer than the head and thorax taken together, dark brown, with a dense erect white pubescence; flagellar segments elongate-cylindrical, the first and the last shortest. Eyes rather small, widely separated by the vertex. Head greyish-brown, clear grey along the margins of the eye.

Mesonotum brownish-grey, the praescutum with three indistinct darker brown stripes; scutum dull grey, the lobes indistinctly brownish; scutellum brownish-grey; postnotum blackish-grey, very narrowly yellowish anteriorly. Pleura blackish with a heavy grey pruinosity, the dorso-pleural membrane yellowish, clearest near the base of the halteres. Halteres long, black throughout. Legs with the coxae black, the posterior face of the hind coxae yellowish; trochanters dull yellowish; legs black. Wings long and narrow, with a long basal petiole; membrane faintly greyish, the subcostal cell brown; stigma oval, pale brown, not passing beyond the radial cross-vein; veins dark brown. Venation:  $Sc_2$  ending about opposite two-thirds the length of the long straight sector; tip of  $R_2$  atrophied, represented only by a small spur; cell 1st  $M_2$  long, hexagonal; petiole of cell  $M_1$  short, a little longer than  $m$ ;  $m$  a little longer than the fusion of  $Cu_1$  and  $M_3+4$ ; second anal vein straight, almost parallel with the anal margin of the wing.

Abdominal tergites blackish, the segments yellowish on the sides, brightest and most conspicuous on the eighth tergite; sternites dark brownish-black, paler laterally. Male hypopygium with the ninth tergite distinct from the sterno-pleurite. Ninth tergite with a broad posterior incision, each small lateral lobe armed with numerous slender black spines; posterior lateral regions of the caudal margin broadly notched. Ninth pleurite narrow, projecting, at its tip bearing a complicated pleural appendage. Pleural appendage a chitinised blade with the outer lateral margin irregularly and minutely serrulate, at the tip suddenly narrowed to an oval lobe that juts into the notch of the tergite; the outer proximal margin with a row of delicate long hairs that are directed backward; near the base of the appendage on the outer side with a sharp arm that is fringed with long hairs, at its tip with a few smaller ones. Ninth sternite broadly membranaceous, the posterior margin with dense fringes of long golden-yellow hairs. Eighth sternite extensive, unarmed.

*Habitat*.—South Africa.

Holotype, ♂, Caledon, Cape Colony, October, 1918 (L. Péringuey).

Type in the South African Museum.

#### GEN. LONGURIO, Loew.

##### LONGURIO CAPICOLA, sp. n.

Nasus bifid, with long reddish-yellow hairs; head reddish-brown; wings almost uniform yellowish-brown, without a subhyaline longi-



tudinal stripe near mid-width of the wing; abdomen dark brown, the basal sternites paler.

*Male*.—Length 14 mm.; wing 16 mm.; fore leg, femur 8·5 mm., tibia 9·8 mm.; middle leg, femur 8·8 mm., tibia 10 mm.; hind leg, femur 11 mm., tibia 12·8 mm.

Frontal prolongation of the head dark brown, the apex of the nasus distinctly notched, each lobe with a tuft of long reddish-yellow hairs; palpi dark brown. Antennae reddish-brown; the first scapal segment and the apical flagellar segment a little darker. Head reddish-brown; vertical tubercle prominent, indistinctly notched in front. Eyes rather small, widely separated both above and beneath.

Mesonotum discoloured in the types, brown, the praescutum with darker stripes, the lateral stripes dark brown; scutellum brown; postnotum clear grey pruinose. Pleura dark brown, grey pruinose, the dorso-pleural membrane light brown. Halteres pale brown. Legs with the coxae and trochanters brownish-yellow; femora dull brownish-yellow, the tips dark brown; tibiae similar, narrowly tipped with brownish-black; tarsi light brown, darkened towards the tips. Wings with a strong yellowish-brown suffusion, the costal and subcostal cells a little darker; stigma distinct, dark brown; a small hyaline area before and beyond the stigma; a narrow streak crosses cell 1st  $M_2$  into the base of cell  $M_4$ . Venation: almost as in *L. bonae spei* (Bergr.); basal portion of  $R_2$  more oblique; cell 1st  $M_2$  wider, second anal vein not slightly sinuous.

Abdomen dark brown, the tergites very narrowly and indistinctly ringed caudally with pale; basal sternites more yellowish; hypopygium slightly brighter. Hypopygium with the ninth tergite having a deep V-shaped notch; pleural appendages with numerous blackened spines.

*Habitat*.—South Africa.

Holotype, ♂, Zonder End Peak, Caledon, Cape Colony, altitude 3600 ft., January, 1919 (K. H. Barnard).

Paratopotype ♂.

Type in the South African Museum.

*L. capicola* is readily told from the related *L. bonae spei* (Bergr.) by the almost uniformly coloured wings. In this regard it agrees more nearly with the much smaller and differently coloured *L. minusculus*, Alex.

#### LONGURIO BELLOIDES, sp. n.

Nasus bifid, provided with long black hairs; head grey; wings dark brown with a distinct subhyaline longitudinal stripe extending from near the wing-base almost to the margin in cells  $M$ , 1st  $M_2$  and  $R_5$ ,

basal half of the anal cells subhyaline; cell 1st  $M_2$  long and narrow; abdomen dark brown, the lateral margins broadly dull yellow.

*Male*.—Length 18 mm.; wing 18 mm.; fore leg, femur 10·3 mm., tibia 13 mm.; middle leg, femur 11·2 mm.; wing 12 mm.; hind leg, femur 12·2 mm., tibia 15·8 mm., tarsus about 32 mm.

Frontal prolongation of the head brown, the nasus distinct, slightly bifid at apex and clothed with long black hairs; palpi dark brown, the terminal segment about equal to the second. Antennae rather short, the first segment of the scape long, first segment of the flagellum pedicellate; remaining segments oval, with subappressed verticils and a coarse white pubescence; antennae brownish-black, the second and third segments paler brown. Head dark grey, paler grey on the prominent vertical tubercle and along the inner margin of the eye, passing into brown on the occipital region.

Mesonotal praescutum light brown, with four stripes, the intermediate pair narrowly separated by a pale vitta, brown, grey pruinose, at least anteriorly; lateral stripes dark brown; scutellum dull yellowish; postnotum dark grey pruinose. Pleura light grey, the dorsal sclerites and the dorso-pleural membrane more tawny. Halteres light brown, the knobs dark brown. Legs with the coxae and trochanters dull yellow; femora brown, a little paler basally; tibiae dull brownish-yellow, covered with an abundant black pubescence, the tips broadly dark brown; tarsi brownish-black. Wings dark brownish-grey with a subhyaline longitudinal stripe at about mid-width of the disc and the bases of the anal cells pale; the pale stripe includes almost all of cells  $M$ , 1st  $M_2$  and  $R_5$ , the tip of the latter narrowly infumed; stigma brownish; veins dark brown. The wing pattern suggests the type found in the Nearctic *Tipula bella*, Lw.; there is scarcely any white colour in cells  $M_1$ ,  $M_2$ ,  $M_4$  or  $Cu_1$  except very indistinct clouds near the base; a broad dark seam along vein  $Cu$ . Venation as in *L. bonae spei* (Bergr.), but cell 1st  $M_2$  long and narrow, petiole of cell  $M_1$  very short; cell  $M_1$  broad, the veins  $M_1$  and  $M_2$  short.

Abdomen not elongated; tergites dark brown, the lateral margins broadly dull yellowish except on the eighth and ninth segments; sternites dull yellow, broadly ringed with dark brown. Hypopygium light yellowish-brown. Hypopygium as in the genus, the tergite with a deep V-shaped notch, the lateral lobes rather pointed, margined with pale; ninth sterno-pleurite elongate.

*Habitat*.—South Africa.

Holotype, ♂, Zonder End, Peak, Caledon, Cape Colony, altitude 5400 ft., January, 1919 (K. H. Barnard).

Type in the South African Museum.

LONGURIO MICROPTERYX, sp. n.

General coloration reddish-yellow, the pleura and abdomen with a blackish lateral stripe; wings very reduced, in the male sex less than one-half the length of the slender halteres.

*Male*.—Length 8.5 mm.

Frontal prolongation of the head short and stout, blackish; nasus indistinct, represented by a tuft of long black setae; palpi short, the first two segments longest, subequal, the last two segments shorter and nearly equal in length, the basal segment provided with long coarse bristles. Antennae rather short, 13-segmented, the scape dull yellowish, the flagellum dark brown; first segment of the scape elongate, the second subglobular; first flagellar segment pyriform with the base very narrow; second and third flagellar segments slightly enlarged, the remaining flagellar segments rather elongate, covered with a sparse pale pubescence and with moderately long, secund verticils. Vertex rather narrow, the vertical tubercle low, indistinctly bifid. Head dark reddish-brown.

Thorax with the mesonotum very flattened, almost as in the genus *Platylimnobia*. Mesonotum reddish-yellow, with an indistinct dusky lateral line that continues caudad on to the abdomen. Pleura reddish-yellow, clearer yellow underneath the wing-root. Halteres brown, the knobs darker, the stem slender. Legs with the coxae very long and tumid, yellowish, the fore coxae a little darker; remainder of the legs brown, darkened on the tarsi; legs rather stout, the tibiae longer than either the femora or metatarsi. Wings blackish, very reduced, less than one-half the length of the halteres.

Abdominal tergites reddish-brown, darkening on the terminal segments, a broad, conspicuous, black lateral stripe extending the length of the abdomen; sternites yellow, more brownish on segments 7 to 9. First abdominal segment long, more than half the length of the second; eighth tergite telescoped beneath the seventh, only the lateral portions being visible; impressed areas on the segments reddish, concolorous with the rest of the abdomen, inconspicuous. Male hypopygium of the normal *Longurio* type, the ninth tergite very deeply notched medially, the lateral lobes obtusely pointed at their tips; ninth sterno-pleurite long, narrowed to the blunt tip, the pleural appendages bearing a row of short black spines as in the other species of the genus.

*Habitat*.—South Africa.

Holotype, ♂, Table Mountain, Cape Colony, 1919 (spring) (R. W. E. Tucker).

Type in the South African Museum.

*Longurio micropteryx* is a typical representative of the genus except for the microscopic wings. In this latter feature it agrees with *Tipula chionoides*, Alexander (Ann. S. Afr. Mus., vol. xvii, pt. ii, 1917, pp. 164, 165), which is also to be considered as being a species of *Longurio*, this reference being based on the bifid nasus and the strong resemblance to the present species, which, from the characteristic structure of the male hypopygium, is an undoubted *Longurio*. *L. micropteryx* differs from *L. chionoides* in its small size, pale coloration, the conspicuous black lateral stripe on the abdomen, the pale impressed areas on the abdominal segments, the different structure to the nasus and numerous smaller characters.

#### GEN. HABROMASTIX, Skuse.

1890. Proc. Linn. Soc. N.S. Wales, vol. 5, ser. ii, pp. 93, 94.

#### HABROMASTIX AFRICANA, sp. n.

Antennae of the male elongate, about as long as the body, the flagellar segments clothed with a dense, erect, pale pubescence; general coloration dark brown; wings dusky, a clear whitish spot before and beyond the stigma.

*Male*.—Length 11 mm.; wing 11 mm.; antenna 10·5 mm.

Frontal prolongation of the head short, dark brown. Palpi short, yellow basally, the terminal segments dark brown. Antennae of the male elongate, filiform, nearly as long as the body; scapal segments short and small, the second cyathiform, with the apex abruptly truncated; first flagellar segment enlarged at the extreme base; segments of the flagellum greatly elongated, clothed with a conspicuous dense, erect, white pubescence; scape light yellow, the flagellar segments dark brown except the base of the first and, less distinctly, the articulations of the succeeding segments. Head broad; eyes large, black; distance separating the eyes moderate, the vertical tubercle prominent, conical; head brown.

Mesonotum rather dark brown without distinct stripes. Pro- and meso-pleurites darker than the yellowish metapleura. Sternites dark. Halteres very long and slender, dark brown, with the extreme base more yellowish. Legs with the fore and middle coxae infuscated, the posterior coxae yellow; trochanters yellow; remainder of the legs broken. Wings dark brownish-grey, the costal and subcostal cells a little darker; stigma elongate, dark brown; a clear whitish obliterative spot before the stigma and a less distinct spot beyond the stigma in cell 2nd  $R_1$ ; veins dark brown. Venation (Plate IV, fig. 17):  $Sc$  long, ending opposite the tip of the sector;  $Sc_1$  persistent;  $Rs$  short,

arcuated at origin;  $R_2$  persistent; petiole of cell  $M_1$  a little longer than  $m$ .

Abdominal tergites dark brown; segments 2 to 7 with a large yellowish area on the sides beyond the base. Sternites yellow except the base and apex of the segments, which are blackish; segments 7 and 8 largely dark brown; remainder of the hypopygium yellowish. Male hypopygium (Plate IV, fig. 25) simple. Ninth tergite large, the posterior margin notched medially. Ninth sterno-pleurite prominent, elongate, but not so excessively produced as in *Longurio*, jutting slightly beyond the level of the tergite. Outer pleural appendage an elongate, pale, fleshy lobe clothed with long hairs; inner pleural appendage more or less chitinised, compressed. Sterno-pleurite profoundly incised on the mid-ventral line, the adjacent margins almost contiguous.

*Habitat*.—South Africa.

Holotype, ♂, Kranskop, Natal, November, 1917 (K. H. Barnard). Paratopotype, ♂.

Type in the South African Museum.

The genus *Habromastix* is principally Australasian in its distribution, but there are three or four Ethiopian species. The genus is very close to *Longurio*, and is separated from it chiefly by the elongate male antennae. In this genus, as well as in *Longurio*, the cell  $M_1$  of the wings varies from sessile to long-petiolate.

#### HABROMASTIX JONESI, sp. n.

Antennae of the male greatly elongated, approximately as long as the body; mesonotal praescutum brownish-grey with four dark brown stripes; wings striped longitudinally with brown, grey and white; legs with the femora black, the tibiae abruptly light yellow except at the tips.

*Male*.—Wing 12 mm.

*Female*.—Length 17–18 mm.; wing 12·3–12·5 mm.; fore leg, femur about 7 mm., tibia 8·5 mm.; middle leg, femur 7·8 mm., tibia 8·7 mm.

Head small, the frontal prolongation rather short, yellowish above, dark brown beneath and on the sides; nasus lacking. Palpi short, dark brown. Antennae of the male greatly elongated, approximately as long as the body; scape yellow; first flagellar segment yellow basally, passing into brown; remaining segments dark brown, yellowish at the sutures; flagellar segments clothed with a long, pale, erect pubescence; verticils very short and sparse. Antennae of the female much shorter than those of the male, but still elongate. Head dark

brown, the front and anterior portion of the vertex whitish, this continued backward as a narrow pale margin around the eyes; a median impressed line on the anterior portion of the broad vertex.

Mesonotum light brownish-grey, the praescutum with four dark brown stripes, the middle pair long and only indistinctly separated from one another by the pale ground colour; lateral stripes short, confluent with the intermediate stripes; region of the pseudosutural foveae grey; scutellum and postnotum greyish. Pleura pale grey with indistinct dark brown blotches on the mesopleura. Halteres rather long, dark brown, the stem much paler. Legs with the hind coxae pale, the fore and middle coxae darkened; trochanters pale; femora dark brownish-black, darkest apically; tibiae abruptly light yellow, dark brown at the tips; metatarsi and the second tarsal segment yellow, darkened at the tips; remaining tarsal segments dark brown. Wings dark brown, the anal cells more greyish, the cells streaked with whitish, these pale streaks occupying the bases of cells 1st  $R_1$ ,  $R_2$  and 1st  $A$ ; the end of cell  $R$ ; the centres of cells  $R_5$ ,  $M_1$ , 1st  $M_2$ , 2nd  $M_2$ ,  $M_4$ ,  $M$ ,  $Cu_1$  and 2nd  $A$ . Venation (Plate IV, fig. 21):  $R_s$  elongate, rather strongly angulated at origin;  $R_2$  persistent, deflected strongly cephalad or outwards at its apex; petiole of cell  $M_1$  about equal to  $m$ ; fusion of  $Cu_1$  on  $M_{3+4}$  extensive, about equal to  $m$ , the fusion beginning at or just beyond the fork of  $M$ , ending at about two-fifths the length of cell 1st  $M_2$ .

Abdominal tergites dark brown above, the basal tergite light yellow, the terminal tergites indistinctly marked with dull yellow laterally; caudal margin of the segments ringed with dull silvery. Sternites mottled dark brown and yellow. Ovipositor with the tergal valves long, slender, straight; sternal valves flattened, compressed, ending a little beyond mid-length of the tergal valves.

*Habitat*.—South Africa.

Holotype, ♂, M'fongosi, Zululand, December, 1916 (W. E. Jones).

Allotype, ♀, with the type.

Paratopotype, ♀.

Type in the South African Museum.

This very interesting species is named in honour of its collector, who has discovered many interesting crane-fly novelties. Unfortunately the abdomen of the unique male is broken off, and nothing can be stated about the male hypopygium.

#### GEN. IDIOTIPULA, gen. n.

Frontal prolongation of the head slender, moderately elongated. nasus very short, indistinct, surrounded by numerous pale hairs;

Palpi very short, only about as long as the prolongation of the head plus the mouth-parts, the last segment oval, the basal segments elongate-oval. Antennae filiform, in the male sex from one and one-half to nearly twice the length of the body, composed of 13 segments; scape enlarged, the second segment very short, cyathiform, only about one-half as long as wide; flagellar segments elongate, the third and fourth longest; thence gradually shortened to the end of the organ; flagellar segments with short, delicate, pale hairs and a few scattered bristles. In the female the antennae are much shorter, the flagellar segments only moderately elongated. Eyes small, widely separated by the broad vertex; vertical tubercle prominent, indistinctly bifid. Thorax broad. Legs moderately elongated; tibial spurs apparently lacking; claws small, untoothed. Wing venation (Plate IV, fig. 16) with *Sc* moderately elongated, extending to beyond mid-length of the long sector; *Sc*<sub>1</sub> persistent; end of *R*<sub>2</sub> beyond *r* entirely atrophied; but two branches of *M* attain the wing-margin; *m-cu* obliterated by fusion. Abdomen moderately elongated, the male hypopygium simple in structure.

Genotype, *Idiotipula confluens*, sp. n. (Southern Ethiopian Region).

This curious fly presents many features that are uncommon or lacking in other members of the subfamily, the short palpi, the apparently unspurred tibiae, and, especially, the reduction of the branches of media.

#### IDIOTIPULA CONFLUENS, sp. n.

Antennae of the male filiform; palpi short; wings dark brown, with but two branches of media reaching the wing-margin; vein *R*<sub>2</sub> atrophied beyond *r*; 2nd *A* short.

*Male*.—Length, 7.5–8 mm.; wing, 8.4–9.2 mm.; antennae, 13.5–14 mm. Fore leg, femur, 5.1 mm., tibia, 5.6 mm.; hind leg, femur 6 mm., tibia 5.6 mm.

*Female*.—Wing, 10 mm.

Frontal prolongation of the head light brown, slender, moderately elongated, the nasus short, surrounded by numerous stiff yellow hairs; palpi short, brown, darker outwardly. Antennae filiform, the second scapal segment light yellow, the flagellum dark brown. Head yellowish-brown with a capillary dark brown median line.

Mesonotal praescutum yellowish-brown with four darker brown stripes, the median pair confluent in front, behind ending before the transverse suture, the lateral stripes continued backward to suffuse the scutal lobes; scutum and scutellum yellowish-brown; postnotum greyish. Pleura yellowish-brown with a clear grey pruinosity.

Halteres slender, brown, the knobs dark brown. Legs with the coxae large, yellowish, with a sparse grey pruinosity; trochanters, femora and tibiae yellow, the tips of the two latter darkened; tarsi brown. Wings with a strong brown suffusion throughout, the stigma but little darker; veins dark brown. Venation (Plate IV, fig. 16) as discussed under the generic diagnosis; 2nd *A* vein very short, the cell long and very narrow.

Abdominal tergites with the first segment pale laterally; tergites dark brown medially, the lateral and posterior margins paler; sternites brown. Male hypopygium (Plate IV, fig. 24) simple. Ninth tergite transversely rectangular, the posterior margin squarely truncated or feebly concave, the dorsal surface provided with numerous stiff, black bristles. Ninth sterno-pleurite projecting strongly caudad, beneath, on the mid-ventral line, profoundly incised by a V-shaped notch. Pleural appendages very simple, closely applied to one another, the longest with about ten to twelve sharp, black spines at the apex and stiff setae along the margin, these latter directed backward; the shorter cephalic lobe is set with abundant stiff setae on raised tubercles.

The type female is teneral, not fully coloured, but is similar to the male in all but the sexual characters.

*Habitat*.—South Africa.

Holotype, ♂, M'fongosi, Zululand, April, 1917 (W. E. Jones).

Allotopotype, ♀, February, 1917.

Paratopotype, 2 ♂♂, February, 1917; 1 ♂, May, 1917. Paratype, ♂, Maritzburg, 1917 (Conrad Akerman).

Type in the South African Museum; paratype in Natal Museum.

#### GEN. TIPULA, Linnaeus.

##### TIPULA CORONATA, Alexander.

Two large male specimens from the Palmiet River, Caledon Division, Cape Colony (K. H. Barnard). They measure from 10–10·2 mm. in length, the wings, 12·5–13·8 mm.

##### TIPULA RUBRONIGRA, sp. n.

Antennae very short, simple in structure; thorax shiny yellowish, the praescutum with dark brown stripes; abdomen and legs black, the hind tarsi very long and slender, greatly exceeding those of the other legs; wings broad, grey, longitudinally streaked with whitish; male hypopygium not enlarged, very simple in structure, the ninth tergite with a rounded notch.

*Male*.—Length, 11·5–12 mm.; wing, 13·5–14·8 mm. Fore leg,



femur 7 mm., tibia 7·6–8·2 mm., tarsus about 13·6 mm. Hind leg, femur 9·3–9·5 mm., tibia 10·3–10·6 mm., tarsus about 30 mm.

Frontal prolongation of the head very short, dark brownish-black, paler basally on the sides; nasus short or practically lacking; palpi short. Antennae short, dark brownish-black, the flagellar segments oval with indistinct verticils. Head broad, dark brownish-black, sparsely dusted with brownish-grey; vertex between the antennal bases elevated, somewhat compressed, and with a deep median furrow.

Mesonotum broad, shiny, dull brownish-yellow, the praescutum with three indistinct dark brown stripes that are confluent behind; scutum yellowish, the lobes brown; scutellum and postnotum dull yellow. Pleura dull brownish-yellow, sparsely yellowish pollinose. Halteres very long and slender, brown, the knobs darker. Legs with the coxae and trochanters dull yellow; remainder of the legs black excepting the basal portions of the femora, which are paler; fore tarsi short, the posterior tarsi excessively elongated. Wings broad, greyish, indistinctly streaked longitudinally with whitish; costal region and the stigma yellowish-brown; a brownish cloud along *Cu*; obliterative streak passing completely through cell 1st  $M_2$ ; extreme tips of veins  $R_1$  and  $R_2$  semi-obiterated. Venation (Plate IV, fig. 19):  $Sc_1$  persistent, situated at the extreme tip of the vein *Sc*; *Rs* long; petiole of cell  $M_1$  a little longer than *m*; *m-cu* at about one-fourth the length of cell 1st  $M_2$ , punctiform or barely obliterated by the fusion of the connecting veins.

Abdomen black, the posterior margins of the segments narrowly, the lateral margins of the tergites more broadly, silvery; lateral margins of the first tergite yellowish. Male hypopygium very small and simple in structure, jet black. Ninth tergite small, the posterior margin with a deep U-shaped notch, the lateral lobes at the margins a little paler. Pleurites fused with the sternite, the pleural suture feebly indicated; pleural appendages small. Ninth sternite rounded on the median line, the posterior margin with a deep U-shaped incision that extends about half the length of the sclerite. Eighth sternite large, the posterior margin unarmed.

*Habitat*.—South Africa.

Holotype, ♂, Krantzkop, Natal, November, 1917 (K. H. Barnard).

Paratopotypes, 2 ♂♂.

Type in the South African Museum.

TIPULA CINEREILINEA, sp. n.

Size small (wing of male 8 mm.); coloration brownish-yellow with a broad, clear ashy dorso-median stripe extending from the frontal

prolongation of the head backwards to the hypopygium; wings subhyaline; *Rs* short, straight, second anal vein short; male hypopygium simple, the pleural appendages armed with sharp chitinised spines.

*Male*.—Length about 7 mm.; wing, 8 mm.

Frontal prolongation of the head brownish-yellow laterally, clear silvery cinereous above, moderately elongated; nasus distinct; palpi elongate, brown. Antennae with the scapal segments dark brown, the first heavily grey pruinose; flagellar segments uniformly yellowish-brown. Head with the occiput and sides of the vertex rich brown, the middle portion of the vertex and front clear ashy, this area narrowed to a point behind. Eyes large, the ommatidia delicate.

Pronotum yellowish-brown on the sides, clear ashy medially. Mesonotal praescutum yellowish-brown laterally, more golden-yellow medially, a narrow ashy line down the extreme median portion; scutal lobes largely golden-yellow, the median area ashy; scutellum and postnotum yellowish-brown laterally, ashy medially. Pleura yellow, sparsely grey pruinose. Halteres short, pale brownish-yellow. Legs with the coxae and trochanters yellow, the remainder more brownish-yellow. Wings of the somewhat teneral type almost clear; when fully coloured probably uniformly suffused with darker. Venation (Plate IV, fig. 18): *Sc* ends about opposite mid-length of the sector; *Rs* short and almost straight; basal deflection of  $M_1 +_2$  long, exceeding *m* in length; *m-cu* present, short; second anal vein very short.

Abdomen with a broad, ashy dorso-median stripe that is interrupted at the sutures; lateral margins of the tergites dark brown; sternites and hypopygium yellow. Male hypopygium very small and simple in structure. Ninth tergite moderate in size, the posterior margin with a broad V-shaped notch, the lateral lobes formed with their margins evenly rounded. Outer pleural appendage sub-oval, flattened, pale, with numerous pale hairs, lying closely appressed to the second or inner appendage; this latter is large, flattened, pale, the outer margin set with about six acute blackened spines, of which four lie posteriorly and two more cephalad; the extreme tip of the appendage is produced into a flattened blade that juts into the tergal notch. Ninth sternite deeply incised on the mid-ventral line. Eighth sternite unarmed.

*Habitat*.—South Africa.

Holotype, ♂, Eshowe, Natal, December, 1916 (Bell-Marley).

Type in the South African Museum.

TIPULA FRATER, sp. n.

Antennae short, yellow; general coloration yellow, the praescutum with four greyish-brown stripes that are margined with dark brown;

wings brown, streaked with whitish; abdomen yellowish, with three dark brown longitudinal stripes.

*Male*.—Length 20 mm.; wing 19.4 mm.; middle leg, femur 13 mm., tibia 13.2 mm.

*Female*.—Length 23 mm.; wing 19 mm.

Frontal prolongation of the head brownish-yellow; nasus very long and slender. Palpi dark brown, paler at the incisures. Antennae short, uniform pale yellow, the terminal segments a little infumed with brown. Head greyish-yellow, brightest on the front anterior-portion of the vertex and along the inner margin of the eyes; an indistinct brownish median line on the vertex.

Mesonotum brownish-yellow, the praescutum with four greyish-brown stripes that are narrowly margined with dark brown; the middle stripes are narrowed and confluent behind, much paler at their anterior ends; scutum dull yellow, the lobes with dark greyish-brown marks; scutellum brown basally, yellowish apically; postnotum yellowish. Pleura yellow. Halteres light brownish-yellow, the knobs dark brown. Legs with the coxae and trochanters yellow; femora yellow, the tips dark brown, broadest on the fore legs, narrowest on the hind legs; tibiae dark brown, the bases conspicuously yellowish; metatarsi dark brown, the extreme base brownish-yellow; remainder of the legs dark brown. Wings brown, streaked with whitish, the costal area brighter, yellowish-brown; a whitish streak occupying the posterior half of cell *R* and the anterior half of cell *M*, and including cells 1st *M*<sub>2</sub> and *R*<sub>5</sub>; pale areas in the base of cell 1st *A* and the end of *Cu*. Venation (Plate IV, fig. 20): *Sc*<sub>1</sub> obliterated; *R*<sub>2</sub> persistent; *m-cu* obliterated by a slight fusion of *Cu*<sub>1</sub> on *M*<sub>3+4</sub>; cell 2nd *A* rather narrow.

Abdominal tergites dull yellow with three brownish longitudinal stripes, the lateral pair usually more distinct, the median stripe obliterated basally but becoming more distinct toward the end of the abdomen; sternites brownish-yellow. Male hypopygium with the sclerites of the ninth segment fused into a continuous ring. Region of the ninth tergite extensive, the median area (Plate IV, fig. 26) produced into a slender but very high lobe that is indistinctly bifid at its tip, which is blackened and indistinctly spinulose; dorsal face of the tergite slightly depressed. Pleural region not set off by a suture. Outer pleural appendage pale, very broad and flattened, the apex obliquely truncated. Ninth sternite strongly carinate on the mid-ventral line. Female ovipositor with the tergal valves very long and slender, straight, a little expanded at the tips; sternal valves very short, ending at about mid-length of the tergal valves.

*Habitat*.—South Africa.

Holotype, ♂, Pretoria, Transvaal, January 17th, 1913 (H. K. Munro).

Allotype, ♀, Nels Rust, Natal, April 24th, 1916 (S. G. Rich).

Paratype, sex ?, Kraunkop, Natal, November, 1917 (K. H. Barnard).

Type in the South African Museum.

This species is closely related to *Tipula soror*, Wiedemann, but the general coloration is much more yellowish, and the details of the wing-pattern and the male hypopygium are slightly different.

TIPULA JOCOSA, Alexander.

The male sex of this handsome crane-fly has not been described, and the single specimen in the present collection is made the allotype.

*Male*.—Length 17.5 mm.; wing 18 mm.; fore leg, femur 11.6 mm., tibia 14.8 mm.; middle leg, femur 12 mm., tibia 13 mm.

Similar to the type female except as follows:

Antennae with both scapal segments yellow, the first flagellar segment yellowish-brown; remainder of the antennae dark brownish-black; antennae moderately elongated, if bent backward extending about to the wing-root.

Mesonotal postnotum blackish, heavily grey pruinose except behind. A narrow dark brown line extending from the postnotum obliquely forwards across the pleura, traversing the mesepimeron and the mesosternum, ending behind the fore coxa. Pleura pale, whitish or yellowish pollinose. Legs with the outer faces of the fore and hind coxae a little darkened basally. Venation as in the type female, the fusion of  $Cu_1$  and  $M_3+4$  much longer than  $r-m$  but shorter than  $m$ .

Abdomen much darker coloured than in the female, the basal tergites yellowish; tergites 2 to 6 broadly dark brown apically with a broad silvery basal ring; tergites 7 and 8 paler, yellowish-brown; sternites pale, the ninth sternite blackish. Male hypopygium (Plate IV, fig. 28) enlarged, the sclerites of the ninth segment fused into a continuous ring that is interrupted only on the mid-ventral line. Region of the ninth tergite (Plate IV, fig. 27) large, ample, the posterior margin concave, the lateral angles slightly produced into thin, heavily chitinised shiny lobes, the median area produced ventrad and slightly caudad into a pendulous pale fleshy lobe that is densely clothed with a fine pubescence. Region of the ninth pleurite ample, with a flattened obtuse tooth ventrad of the lateral angles of the tergite. Pleural appendages dark coloured, the outer appendage a small, elongate-cylindrical, sparsely hairy lobe; inner appendage small, heavily chitinised, the apex produced into a cylindrical beak that is directed

cephalad, the outer margin of the lobe fringed with delicate erect hairs. Angle of the pleural region ventrad of the appendages, and the adjacent region of the ninth sternite each with a sparse brush of long yellow hairs. Ninth sternite profoundly incised on the mid-ventral line, the margins of the incision pale yellow, contiguous with one another. Eighth sternite carinate, unarmed.

Allotype, ♂, Maritzburg, Natal, 1917 (K. H. Barnard).

Allotype in the South African Museum.

*TIPULA SETOSIPENNIS*, Alexander.

1920. *Tipula setosipennis*, Alex., Ann. Mag. Nat. Hist., ser. 9, vol. 5, pp. 61, 62.

Cedara, Natal, March 12th, 1920 (S. H. Skaife).

GEN. *NEPHROTOMA*, Meig.

*NEPHROTOMA CROCEA* (Loew.), var.

Waterberg, Damaraland, February, 1920 (R. W. Tucker).

These specimens are scarcely typical of this species, and yet there are no tangible characters on which to separate them. The differences in coloration are probably explainable by ecological factors involved.

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## EXPLANATION OF THE PLATES.

## PLATE III.

## FIG.

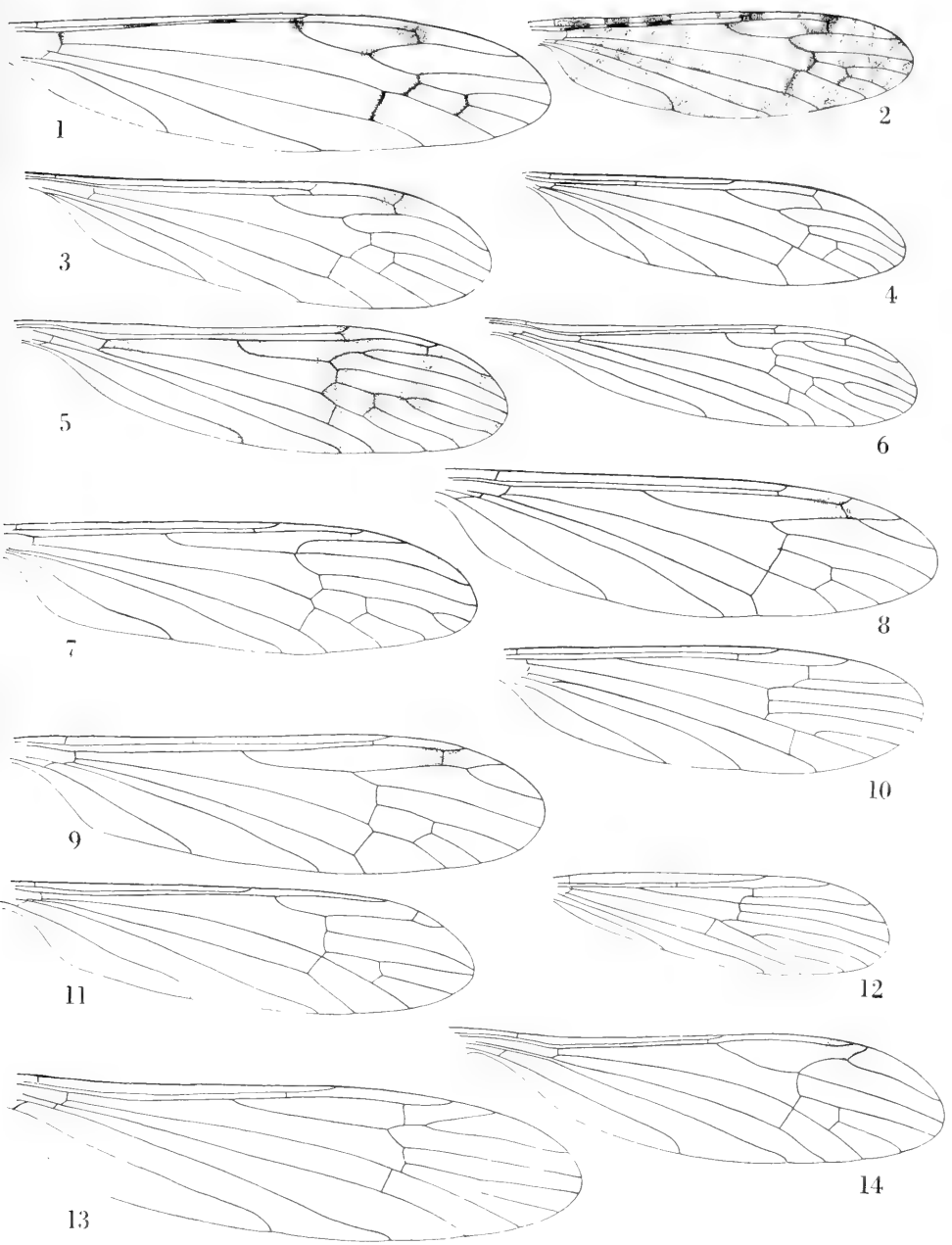
- 1.—Wing of *Dicranomyia gardineri*, Edwards.
- 2.—Wing of *Rhipidia miosema* (Speiser).
- 3.—Wing of *Dicranomyia confusa*, sp. n.
- 4.—Wing of *Geranomyia* (*Monophana*) *subimmaculata*, sp. n.
- 5.—Wing of *Limnophila spectabilis*, sp. n.
- 6.—Wing of *L. natalensis*, sp. n.
- 7.—Wing of *L. nox*, sp. n.
- 8.—Wing of *Eriocera capensis*, sp. n.
- 9.—Wing of *E. humilis*, sp. n.
- 10.—Wing of *Erioptera claripennis*, sp. n. (diagrammatic).
- 11.—Wing of *Gonomyia sulphurelloides*, sp. n.
- 12.—Wing of *Molophilus eriopteroides*, sp. n.
- 13.—Wing of *Gonomyia flaveola*, sp. n.
- 14.—Wing of *G. mimetica*, sp. n.

## PLATE IV.

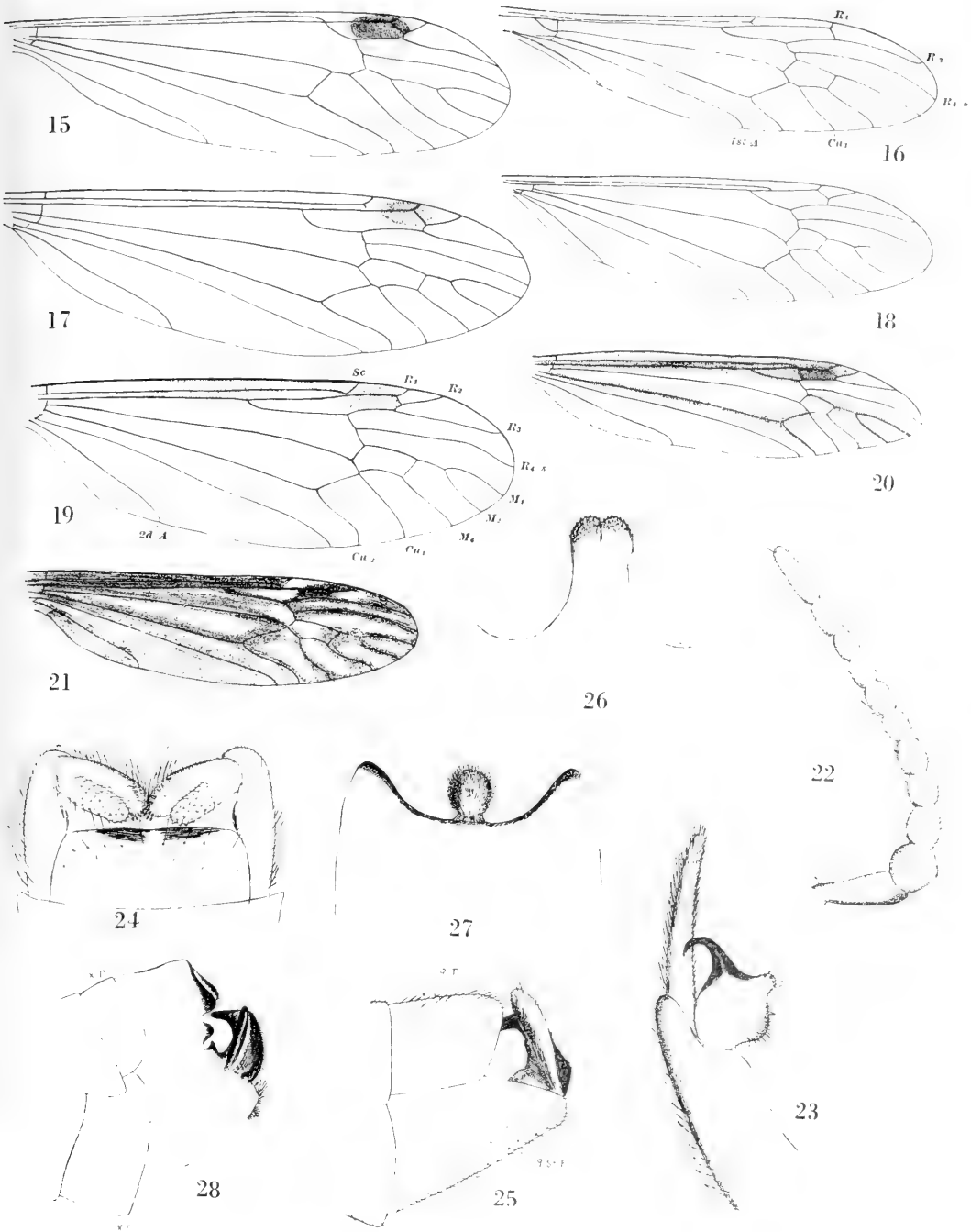
## FIG.

- 15.—Wing of *Dolichozepe* (*Trichodolichozepe*) *aurantiaca*, sp. n.
  - 16.—Wing of *Idiotipula confluens*, sp. n.
  - 17.—Wing of *Habromastix africana*, sp. n.
  - 18.—Wing of *Tipula cinereilinea*, sp. n.
  - 19.—Wing of *T. rubronigra*, sp. n.
  - 20.—Wing of *T. frater*, sp. n.
  - 21.—Wing of *Habromastix jonesi*, sp. n.
  - 22.—Antenna of *Platylimnobia pumila*, sp. n.
  - 23.—Hypopygium of *Gonomyia mimetica*; pleural appendages, dorsal aspect.
  - 24.—Hypopygium of *Idiotipula confluens*; dorsal aspect.
  - 25.—Hypopygium of *Habromastix africana*; lateral aspect.
  - 26.—Hypopygium of *Tipula frater*; ninth tergite, dorsal aspect.
  - 27.—Hypopygium of *T. jocosa*, Alexander; ninth tergite, dorsal aspect.
  - 28.—Hypopygium of *T. jocosa*; lateral aspect.
- Abbreviations: *Sc* = subcosta; *R* = radius; *M* = media; *Cu* = cubitus  
*A* = anal veins *T* = tergites; *S* = sternites; *St. Pl.* = sterno-pleurites.











3.—*A New Genus and Species of Tanyderidae (Péringueyomyia barnardi) in the South African Museum (Diptera).*—By CHARLES P. ALEXANDER, Ph.D. (Cornell).

(With 1 Text-figure.)

The family Tanyderidae, including the most primitive of the living crane-flies, has hitherto been represented only by two recent genera with nine species. A new and most interesting genus has been recently discovered in Cape Colony by Mr. Barnard, and is described hereinafter as *Péringueyomyia barnardi*, gen. et sp. n. This is the first species of the family to be made known from the Ethiopian region.

The distribution of the ten known species of this palæogenic group of insects may be summarised as follows: The first recent genus to be made known was described in 1859 by Osten Sacken under the name *Protoplasa* for the new species *fitchii* (1859). This fly is found in eastern North America. In 1877 the second species, *P. vipio* (O. S.) (1877), was described from California. In 1918 the third and last described species of the genus, *P. vanduzeei*, Alex. (1918), likewise from California, was made known. In 1865 Philippi erected the second recent genus, *Tanyderus*, for the Chilian species, *pictus*, Philippi (1865). Five species have since been added to this genus, one other (*patagonicus*, Alex., 1913) being Neotropical, the others Australasian, two from New Zealand (*forcipatus*, O. S., 1880, *annuliferus*, Hutton, 1900), and two others from the small islands west of New Guinea (*ornatissimus* (Dol.) 1858, *mirabilis*, de Meij., 1915). In 1880 Osten Sacken gave to this group the subfamily name Tanyderina, and it is this name that has been adopted for the family. Handlirsch (1909) has reviewed our knowledge of the fossil and recent Tanyderidae, erecting supposedly new genera for each of two of the known species of *Tanyderus* (*Radinoderus* for *ornatissimus* (Dol.), *Mischoderus* for *forcipatus*, O. S.) and another (*Protanyderus*) for *Protoplasa vipio* (O. S.). Those generic names are based on very trivial characters that have been further weakened by the subsequent discovery of *Tanyderus patagonicus*, Alex., *T. mirabilis*, de Meij., and *Protoplasa vanduzeei*, Alex., all of which, following the characters adopted by Handlirsch, would constitute additional new groups in the family. Thus almost every species would represent a distinct genus, and the difficulty of distinguishing between these groups would be increased with the addition of forms subsequently to be made known. De

Meijere has pointed out the slight distinctions between the various Handlirschian genera, and the increased difficulty of separating these groups with the accession of new forms. It seems best to recognise but the three recent genera, *Protoplasa*, Osten Sacken, *Tanyderus*, Philippi, and *Péringueyomyia*, gen. n.

The discovery of a species of this family of flies in Africa is of more than usual interest, as it bridges a very important gap in the known distribution of the family. The present insect differs so remarkably from all of the previously described species of the family that it is necessary to erect a new genus to receive it. The name *Péringueyomyia* is proposed, in honour of Dr. Louis A. Péringuey, as an appreciation of the many favours shown the writer in his studies on the Tipuloidea of South Africa. The presence of an elongate rostrum is unique in the family, although long known in the related family Tipulidae, where it occurs in several widely-separated tribes. Nothing is known of the habits of the genotype, *P. barnardi*, but from the structure of the rostrum it seems probable that the insect feeds on the nectar of tubular flowers as in the Tipulid genera, *Geranomyia*, *Toxorhina* and others with conspicuous elongate rostra.

## FAM. TANYDERIDAE.

### GEN. PÉRINGUEYOMYINA, gen. n.

Rostrum elongate, exceeding the combined head and thorax; rather stout, cylindrical, with the base enlarged, the surface with numerous subappressed hairs bearing the mouth-parts at the apex; maxillary palpi slender, four-segmented, the three basal segments subequal in length, the last segment about a third longer than the penultimate; labial lobes fleshy, transverse. Antennae with apparently only 16 segments, moderately elongated, setaceous; second scapal segment swollen, subglobular; three basal segments of the flagellum stout, the remaining segments gradually elongated, slender, provided with long verticils that are about equal in length to the segments that bear them; in addition to the verticils, the segments possess a rather abundant suberect pubescence. Head narrowed behind. Eyes large, broadly contiguous beneath, narrowly separated by the vertex above; the ommatidia small with short erect hairs between them. Prothorax large and conspicuous, as in the family. Legs with the margin of the hind coxae swollen anteriorly and provided with a row of black setae; tibiae with short spurs. Wings broad, with five radial, three medial and a single anal vein attaining the margin; *m-cu* distinct; anal

angle moderately prominent. Male hypopygium with the pleurites very slender, greatly elongated, gradually narrowed to the tips, each bearing a single very elongate, cylindrical appendage that is provided with a series of about 30 slender spines and numerous erect setae along its inner margin, at the apex with two elongate bristles.

Genotype, *Péringueyomyina barnardi*, sp. n. (Southern Ethiopian region).

This new group is easily separated from the related genera of the Tanyderidae by the elongate rostrum and by the structure of the antennae and male hypopygium. The genus *Macrochile*, Loew (fossil in Baltic amber), has the rostrum longer than the head, but the large and conspicuous palpi arise from near the middle of its length.

I take great pleasure in dedicating this remarkable genus to Dr. L. A. Péringuey.

*PÉRINGUEYOMYINA BARNARDI*, sp. n.

Rostrum and antennae black; mesonotum brownish-yellow, the praescutal stripes indistinct; wings yellowish, the stigma small, pale brown; abdomen ringed with brown and yellow.

*Male*.—Length (excluding rostrum and genitalia) 8.6 mm.; rostrum alone 3.7 mm.; genitalia, pleurite 2 mm.; appendage 2 mm.; wing 10 mm.; greatest width 3 mm.; antenna about 2.3 mm.



*Péringueyomyina barnardi*, sp. n.

[♂] Rostrum, including the mouth-parts, dark brownish-black. Antennae black; in the type only 14 segments are present, but the extreme apex is broken, and the complete organ presumably has either 15 or 16 segments. Head dark.

Pronotum brownish-yellow, passing to almost black on the mid-dorsal region. Mesonotum shiny brownish, with three indistinct darker shiny stripes on the praescutum, the scutal lobes brownish.

Pleura dull yellow, the mesopleura more brownish, darkest, almost purple, near the dorsal portion of the mesepimeron. Legs with the coxae dull yellow; trochanters a little darker; remainder of the legs broken. Halteres pale, the elongate knobs dark brown. Wings with a slight yellowish tinge; stigma small, elongate-oval, pale brown; veins dark brown, with long setae. Venation:  $Sc_1$  ending opposite about two-thirds the length of  $R_{2+3}$ ;  $Rs$  about three-fourths as long as  $R_{2+3}$ , only moderately elongated, unspurred at origin; basal deflection of  $R_5$  arising from  $R_4$  a short distance beyond the forking of the sector; cell 1st  $M_2$  rather small, about as long as  $Rs$ ,  $M$  in direct alignment with  $M_{1+2}$ ; deflection of  $M_{3+4}$  about one-half longer than  $r-m$ ;  $m$  inserted between veins  $M_2$  and  $M_3$ ;  $m-cu$  distinct; no indication of the second anal vein.

Abdomen conspicuously ringed with brown and dull yellow, the tergites with the apical third brown, the sternites with the posterior brown margins much narrower. Segments 8 and 9, including the hypopygium, brown. Male hypopygium as described under the generic characterisation.

*Habitat*.—South Africa.

Holotype, ♂, Oudebosch, Caledon, Cape Colony, altitude 1500 ft., January, 1919 (K. H. Barnard). Type in the South African Museum.

Paratype, ♂ Hottentots-Holland Mountains, Cape Colony, altitude 3000 ft., March, 1919 (K. H. Barnard).

This species is dedicated to the collector, Mr. Keppel H. Barnard.

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 1918. ALEXANDER.—Ent. News, vol. xxix, pp. 285, 286.



4.—*Descriptions of some South African Heterocera (Lepidoptera).*—By  
CHR. AURIVILLIUS.

The species described in this paper were sent to me some years ago by the Director of the South African Museum, Dr. L. Péringuey. The types are all in that Museum, and some co-types in the State Museum, Stockholm.

The existence in South Africa of the palaearctic genus *Chondrostega* and of a genus *Trichiurana*, very nearly allied to *Trichiura*, is of great geographical interest.

## ARCTIIDAE.

### GEN. POECILARCTIA, nov. gen.

Proboscis short and weak. Palpi porrect, short, not extending beyond frons; last joint minute, obliquely pointed. Head and thorax clothed with hair. Antennae of male bipectinate with moderate branches. Eyes smooth. Frons without prominence. Fore tibiae normal, unarmed, hind tibiae with short apical spurs, medial spurs absent. Fore wing with vein 3 from close to angle of cell; 4, 5 from angle or very briefly stalked; 6 from upper angle; 7, 8, 9 stalked, 10, 11 on a long stalk from cell. Hind wing with 3, 4, 5 from angle of cell, 6, 7 from upper angle, 8 from middle of cell.

Differs in venation from all African genera of Arctiidae.

### POECILARCTIA VENATA, n. sp.

Head yellowish with a large black patch between the antennae; palpi black, scarlet below; thorax white with black mesial stripe, patagia edged with black; tegulae laterally edged with black; femora scarlet, white below, tips black; tibiae and tarsi black; abdomen pale yellow above, whitish below, with dorsal, lateral and sublateral series of black spots; fore wing above white with all the veins broadly lined with black, costal edge scarlet towards base; hind wing above and below yellow with the veins 6-8 narrowly black at termen; fore wing below nearly as above but the ground-colour yellowish. Expans. 42 mm.

Mashonaland: Salisbury (Dr. J. M. Melle).—S. African Museum.

## LASIOCAMPIDAE.

## GEN. CHONDROSTEGA, Led.

## CHONDROSTEGA RUFICORNIS, n. sp.

♂. Body and wings fuscous, thorax darker blackish, densely clothed with long hairs; wings sometimes with an obsolete paler discal fascia, more distinct on the underside of hind wing; frontal protuberance short, entirely hidden by the long hairs; antennae broadly pectinated to tip, rufous yellow; fore tibiae very short with two long apical claws, the inner claw longer and curved; vein 8 of fore wing absent, 7 curved and emitted from the same point as 6 and the common stalk of 9 and 10; veins 9 and 10 to the termen; hind wing with vein 8 from near the base, two accessory veinlets at base. Length of fore wing 12 mm., expans. 27 mm.

Cape: Calvinia District, Loeries Fountain.—S. African Museum and State Museum in Stockholm.

## GEN. TRICHIURANA, nov. gen.

Nearly allied to the palaearectic genus *Trichiura*, but differing in having naked eyes; veins 7 and 8 of fore wing briefly stalked from end of cell and the veins 9 and 10 much longer than their stalk; Venation of hind wing completely agreeing with my figure in *Iris*, vol. vii, pl. 3, fig. 3. Frons with a pointed corneous prominence. Antennae in both sexes bipectinate to tip, with the branches shorter in the female.

## TRICHIURANA MERIDIONALIS, n. sp.

♂. Head, thorax and legs cinereous; abdomen brownish; eyes surrounded by blackish hairs; fore wing above whitish with blackish veins; termen, costa and hind margin fuscous, a black discal point and irregular blackish stripes along veins 2 and 5; hind wing on both sides and fore wing below fuscous; cilia very broad fuscous. Length of fore wing 14 mm.

In the ♀ the upper part of the wings is more uniformly greyish with fuscous ciliae; fore wing with a black discal point and an obsolete fuscous median fascia. Length of fore wing 18 mm.

Orange Free State, Smithfield.—S. African Museum.

## GEN. BERALADE, Walk.

## BERALADE (CHILENA) PARVA, n. sp.

♂. Head and thorax above dark fuscous; pectus, legs and abdomen

much paler yellowish brown; antennae pale yellow; fore wing above dark fuscous with two short whitish streaks at base, an indistinct pale dot with blackish ring at end of cell and an oblique dentate blackish line from apex to hind margin beyond middle; this line rather broadly edged with white on inner side from apex to vein 5 or 4; terminal area speckled with whitish scales; hind wing pale greyish, darker in terminal area, especially at apex and tornus. Length of fore wing 10 mm., expans. 23 mm.

Cape Colony: Kimberley.—S. African Museum.

The smallest known species of the genus *Beralade*; very distinct but undoubtedly allied to *B. Levenna* and *Marshalli*. Eyes hairy.

# GEN. BOMBYCOPSIS, Feld.

## BOMBYCOPSIS CAPICOLA, n. sp.

Head, thorax and abdomen greyish yellow brown, abdomen hardly paler; fore wing above from base to beyond the middle yellowish brown with the antemedial line obsolete and the discal line fuscous but very indistinct and narrow, nearly straight; post discal area paler, greyish, clothed with pale feathered scales and marked with an irregular series of dark streaks between the veins, ending in a darker point or streak at hind margin; all the veins distinct yellowish; hind wing greyish yellow, unicolorous in the male, marked with a diffused median darker fascia in the female; both wings below yellowish with the veins a little darker and very distinct in the female. Length of fore wing 15–20 mm., expans. 36–46 mm.

Cape Colony.—S. African Museum.

Allied to *B. bipars*, Walk., and *metallicus*, Dist.; differing from both in having the transverse lines of fore wing nearly obsolete and very narrow. The eyes are clothed with long hairs.

# GEN. GLOCIA, Saalm.

## GLOCIA STRAMINEA, n. sp.

♂. Pale stramineous, slightly sericeous; antennae blackish with long ferruginous branches; eyes hairy, bordered with black hairs; tibiae and tarsi brownish; wings above unicolorous without markings; fore wing below infuscated in the cell, at middle of costal margin and at base of the areas 3 and 4; area 5 nearly white. Length of fore wing 18–19 mm., expans. 40 mm.

South Africa.—S. African Museum and State Museum, Stockholm.

## GEN. CYMATOPACHA, nov. gen.

Palpi broad, hardly reaching beyond the frons. Eyes smooth. Antennae of female bipectinate to apex. Head and thorax clothed with long hairs. Tarsi without hairs. Hind tibiae with short apical spurs. Wings as in *Pachypasa*, but with termen distinctly and regularly sinuous; hind wings with costa lobed at base and slightly incised before middle. Fore wing with veins 4 and 5 from nearly the same point; 6 and 7 stalked, 8 from apex of cell; 9 and 10 stalked, shorter than their stalk; 9 to termen. Hind wing with veins 4 and 5 on a short stalk; 8 anastomosing with 7 near base; praecostal cell small, emitting a cluster of accessory costal veinlets into the basal lobe.

*Cymatopacha* agrees in venation with *Mimopacha*, Auriv., but differs by having the termen regularly sinuous and the hind wing without hyaline discal spot. From *Pachypasa* it differs by the venation of the fore wing.

## CYMATOPACHA OBSCURA, n. sp.

♀. Hoary grey; head and thorax fuscous; wings dark grey, densely suffused with fuscous; basal and medial area of fore wing dark fuscous, distally determined by the dark dentate very oblique post-medial line, which is filled out distally with yellowish grey; an indistinct fuscous and yellowish dentate submarginal line from near apex to hind margin behind middle. Hind wing paler on inner margin with the submarginal line of fore wing indistinctly continued across the middle. Underside nearly as the upperside but much paler. Expans. 81 mm.

S. Rhodesia: Bulawayo (R. W. E. Tucker).—S. African Museum.

## GEN. PACHYPASA, Walk.

## PACHYPASA SERICEOFASCIATA, n. sp.

♀. Fawn colour. Head and thorax above cinereous with a slight violaceous tint; thorax and abdomen below as well as the legs darker brownish; abdomen luteous. Fore wing with two oblique irregular pale violaceous grey bands, sometimes confluent at middle; proximal band from middle of costa to hind margin before middle, slightly excurved in middle; distal band from apex to hind margin a little behind middle, slightly bordered with fuscous on inner side and strongly dilated on outer side between vein 4 and tornus; an obsolete dark mark at apex of cell; no other markings. Hind wing uniformly

pale luteous fawn colour, not paler at termen. Ciliae a little darker. Expans. 70–78 mm.

*Type* in S. African Museum from Durban, Natal. Another specimen with the bands of fore wing confluent in the middle, in Janse's Collection from New Hanover.

Nearly allied to *P. capensis* and *albofasciata*, differing from *capensis* by the hind wing not being paler at termen and from the latter by the shape and colour of the bands of the fore wing.

PACHYPASA ALBOFASCIATA, n. sp.

♀. Vertex of head and thorax above grey. The latter with a fuscous mesial stripe; frons below the antennae, palpi and the whole underside dark rufous brown; fore wing above dark brown, paler towards outer margin; two oblique slightly waved whitish bands; first band antemedial, beginning at hind margin before middle and nearly straight to vein 5, thence curved to the middle of costa, where it is somewhat dilated; second band nearly straight from hind margin a little beyond middle to costa near apex, slightly incurved at veins 2 and 3; the ground-colour darker between the bands; hind wing fawn colour without markings; both wings below dark rufous brown; tarsi dark brown, not or slightly ringed with yellowish. Length of fore wing 39 mm.

♂. Smaller and much darker; head, thorax and fore wing above dark castaneous brown; thorax with some fine greyish lines in the middle, and the sides of the patagia clothed with paler hairs; the white bands of fore wing sharply contrasting with the dark ground-colour; underside of body and wings fuscous brown. Length of fore wing 23 mm.

South Africa: Cape Colony.—S. African Museum.

Seems to be nearly allied to *P. bifascia*, Walk., but without brown basal streak near the interior border of fore wing.

## JANIDAE.

GEN. MARMAROPLEGMA, Wallengr.

MARMAROPLEGMA CONSPERSA, n. sp.

Forehead, antennae, legs, pectus, abdomen, underside of both wings as well as the upperside of hind wing pale ochreous yellow; vertex and thorax above hoary grey; fore wing above whitish grey uniformly conspersed with black scales without markings; costa and cilia

yellowish; hind wing above slightly conspersed with darker scales at termen. Length of fore wing 24 mm., expans. 53 mm.

South Africa.—S. African Museum. 1 ♂.

Venation and form of the wings as by *M. paragarda*, only differing in having vein 8 of hind wing free (not connected with the cell by a bar) and veins 5 and 6 of fore wing shortly separated at their origin.

## NOTODONTIDAE.

### GEN. ANTHEUA, Walk.

#### ANTHEUA RADIATA, n. sp.

♂. Head and thorax pale stramineous, patagia edged with yellow hairs; frons fuscous yellow; eyes surrounded by black hairs; femora black above; tibiae blackish with basal tuft of long whitish hairs; tarsi white, ringed with black; abdomen deep rufous above with broad lateral series of black tufts, white below and at extremity; fore wing whitish with all the veins broadly lined with black and greyish scales; base of the areas 2 and 3 filled out with such scales; hind wing stramineous yellowish at base and inner margin; both wings with a fine black terminal line more distinct on the under side and ending at vein 16 of hind wing; underside stramineous white with the veins more or less darkened in terminal area; antennae yellowish, bipectinate to near tip, branches very short in apical fifth. Length of fore wing 19 mm., expans. 45 mm.

Transvaal: Pilgrims' Rest (Miss Schunke)—S. African Museum. This well-marked species seems to be allied to *A. trivitta*, Hamps., from Abyssinia.

### GEN. PARAPHLEBS, nov. gen.

Head and thorax clothed with hairs. Palpi porrect, not reaching beyond the frons. Eyes smooth, rather small. Antennae bipectinated to apex, branches moderately long. Proboscis and frenulum absent. Femora and tibiae hairy; tarsi naked; hind tibiae with 4 spurs; hind tarsi without distinct spines, the pulvilli nearly as long as the claws. Abdomen a little longer than hind wing, stout, cylindrical, obtuse at apex and provided with a dense apical tuft of hairs; sides hairy. Wings formed completely as in some Limacodidae—for instance, *Contheyla vestita*, Walk. (Hampson, Faun. Brit. India, Moths, vol. i, p. 385, fig. 262).

Fore wing with vein 1 shortly forked at base, vein 1c absent, vein 3

well before angle of cell but nearer to 4 than 2, vein 5 from nearer to 6 than 4, vein 6 from upper angle of cell, 7, 8, 9, 10 stalked, 11 free, 7 from 8 beyond 10. Hind wing with vein 1a to anal angle, 1b to an angle on termen, 1c rather distinct, weaker at base, 2-4 nearly as in fore wing, 5 nearer to 6 than 4 and slightly weaker than the other veins, 6 and 7 very briefly stalked, vein 8 free at base, then anastomosing with the cell to beyond middle as in the genus *Polelassothys*, Janse.

A very peculiar genus, which does not fit well in any of the hitherto proposed families of moths, but may provisionally be considered as an aberrant genus of the Notodontidae.

Some years ago I received specimens from Mr. A. J. T. Janse in Pretoria. The genus not being mentioned in his newly-published excellent monograph of the South African Notodontidae, leads me to suppose that he has considered the genus as foreign to the family.

It is often rather difficult to decide if the vein 1c of hind wing is present or not. In my opinion the vein 1c must be considered as present in *Paraphlebs*. If so the genus, according to Hampson's newly-published key to the families of Lepidoptera, would belong to the Chrysopolomidae (Ectropidae),\* with which it has no affinities at all.

PARAPHLEBS SINGULARIS, n. sp.

Head and thorax yellowish, more or less densely clothed with grey and blackish hairs; abdomen and tarsi ochraceous yellow; femora and tibiae with long, mostly greyish hairs; anal tuft darker in the female, with densely-packed greyish scales in the middle. Fore wing greyish variegated with fuscous, brown and pale yellow; basal area to antemedial line fuscous brown with convex distal margin, a paler stripe from base below the median vein and vein 2 nearly to termen partly pale yellow, partly brownish yellow, composed as it were of differently coloured spots; medial area proximally grey, distally brownish, a rather obscure brownish discal spot; postmedial line waved, blackish; terminal area fuscous with yellowish terminal spots between the veins; ciliae broad, yellowish with dark spots between the veins. Hind wing fuscous, slightly suffused with black at tornus; ciliae as in fore wing. Wings below yellowish more or less suffused with fuscous. Expans. 29-31 mm.

Transvaal: Barberton and Potgietersrust.—S. African Museum.

\* I cannot agree with Sir G. F. Hampson in rejecting old family names because they are not taken from the oldest genus at present included in the family. The law of priority seems to require that the oldest name of families be used as well as of genera and species.

The sexes are nearly alike. The female only differs by the branches of the antennae being a little shorter and the anal tuft filled up in the middle by a mass of grey scales.

It would be of great interest to know the first stages of this peculiar moth.

## LIMACODIDAE.

### GEN. PARATHOSEA, nov. gen.

Palpi upturned, falciform, appressed to the frons, nearly reaching base of antennae, smoothly scaled, last joint conical. Antennae in male bipectinated to tips, the branches rather short and gradually shorter towards the apex. Thorax scaled, with long tuft on meta-thorax. Abdomen at base with two large dorsal crests of scales. Middle and hind tibiae very broadly clothed with hairs; hind tibiae with 4 spurs. First joint of middle and hind tarsi clothed with very long hairs, the following joints with shorter hairs or nearly smooth. Fore wing with veins 4 and 5 from a point, 6 a little nearer to apex of cell, 7, 8, 9 stalked, 10 and 11 free from the cell; 11 straight. Hind wing with veins 6 and 7 stalked, 8 somewhat thickened at base and connected with the cell beyond its middle by a very short oblique bar.

I have not been able to refer the following species to any of the hitherto described genera of Limacodidae. The palpi are peculiar, and distinguish the present genus from *Brachia*, Karsch, which in other respects seems to be rather nearly allied.

### PARATHOSEA PÉRINGUEYI, n. sp.

♂. Head and antennae yellowish brown; palpi dark brown on underside, yellowish above. Thorax and legs dark brown, thorax above with plumbeous scales, especially on the patagia. Abdomen somewhat paler brown with the crests yellowish; apex of tibiae and the tarsi annulated with yellow. Fore wing above with the basal part dark brown with a strong plumbeous sheen in certain light; this basal dark field occupies three-fourths of the costa, but only the first third of the hind margin; its distal margin is therefore very oblique; it is marked from the end of the cell to the hind margin with a sharply dentate black line, and followed by an irregular pale yellowish, broad, oblique band from near apex of costa to hind margin; this band is ill-defined and more or less filled up with irregular spots and patches of greyish scales; a terminal rather broad dark band more or less spotted with yellowish; cilia broad, greyish brown, with a distinct yellow basal



line. Hind wing fuscous without markings; cilia with a yellowish line at base and a whitish line near margin. Underside of both wings fuscous with yellowish veins; hind wing broadly yellowish at inner margin. Expans. 30–32 mm.

Transvaal: Potgietersrust and Marico River.—S. African Museum.

## ARBELIDAE.

GEN. ARBELODES, Karsch (non Hampson).

ARBELODES COLLARIS, n. sp.

♂. Head, palpi, fore coxae, shoulders and base of tegulae dark fuscous or blackish; hind edge of tegulae broadly whitish; patagia whitish, black at base, forming with a black spot on fore edge of mesothorax a black collar ring; metathoracic crest large, blackish; abdomen pale fuscous brown with darker basal crest and divided anal tuft; underside and legs greyish; hind tibiae with four spurs; tarsi slightly annulated with black. Antennae with the shaft whitish and the pectination black, partly suffused with greyish. Fore wing fuscous with black and white markings; costa with a series of black spots from base to postmedial line; basal area black, defined by silvery white and strongly excurved below median nervure, a black spot from middle of hind margin to vein 2 followed by a whitish suffusion to postmedial line, a black somewhat wedge-shaped spot in middle of cell, the whole area between this spot and the post-medial line suffused with whitish; postmedial line black, nearly erect, irregularly waved and defined on inner side with white; terminal area greyish at termen with short, erect, black streaks between the veins. Hind wing fuscous, paler at base. Cilia fuscous brown, in distal half chequered with whitish spots between the veins. Underside of both wings dark fuscous without markings. Expans. 28–29 mm.

Transvaal: Potgietersrust. Type in S. African Museum and co-type in Riksmuseum at Stockholm.

Sir G. F. Hampson has overlooked the fact that Karsch, in his key to the genera of (Hollandiidae) Arbelidae, especially states that the fore wing has an areola ("Anhangszelle"). This being the case, *Arbelodes*, Hamps., is not the same genus as *Arbelodes*, Karsch, and must take the name of *Ortharbela*, Auriv.

*Arbelodes collaris* is undoubtedly nearly allied to *meridionalis*, Karsch, but can hardly be the same species, unless the description was made from a very badly-worn specimen.

In the collection kindly sent by Dr. L. Péringuey there is also a specimen of another species of *Arbelodes* from the same locality, but not in a fit condition to be described.

It may be noted here that the character on which Strand and Hampson founded the genus *Metarbelodes* is not constant, the vein 10 of fore wing sometimes in the same species (*umtaliana*) being emitted from vein 8, sometimes from the areola.

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5.—*The Odonata or Dragonflies of South Africa.*—By F. RIS.

(With Plates V–XII and 77 text-figures).

THE origin of the present paper is a request by Dr. L. Péringuey to the author to write a paper which would help the resident entomologist to get a reliable knowledge of the South African dragonflies. In 1908 the writer had published in “Schultze’s Forschungsreise im westlichen und zentralen Südafrika” (‘Denkschrift mediz.-naturw. Ges. Jena,’ xiii, pp. 303–346, 1908) an annotated catalogue of the fauna herein discussed, and this catalogue, in the opinion of Dr. Péringuey, would have to be modified for the purpose above mentioned. The collection of the Schultze expedition being a small one, and other material available at the time very limited, the paper of 1908 was a compilation to a large extent; also its character as a catalogue made its value doubtful for the student who had no access to the libraries and collections of European cities. The need of the local collector and student was a descriptive and fully illustrated paper. But to attain this object an extensive collection was indispensable, and Dr. Péringuey kindly agreed to provide specimens for the purpose; the results of his initiative reached me in a considerable number of consignments, and were in the long run amply sufficient to serve as a basis for the present work. Moreover, the author had at his disposal an interesting collection of South African dragonflies made by Miss Margaret Fountaine, of Bath, loaned through the kindness of her friend, Mr. K. J. Morton, of Edinburgh, and an extensive lot of very interesting specimens from the British Museum, loaned through the good offices of Messrs. G. Meade-Waldo and Herbert Campion. At a somewhat later date Mr. E. B. Williamson, of Bluffton, Indiana, U.S.A., forwarded a large collection, consisting of various lots sent him by Mr. G. F. Leigh, of Durban, Natal, and by Mr. G. A. K. Marshall, when this gentleman was a resident of Salisbury, Mashonaland. Other specimens from the Marshall collections were also included in the British Museum lots as well as in material sent for study by the Swedish Imperial Museum at Stockholm. The Congo Museum at

Tervueren sent a very important lot of specimens from Katanga, which lot, though not strictly belonging to the fauna in question, has been repeatedly quoted.

In the writer's own collection South African species are chiefly represented by material from the Delagoa Bay region, kindly forwarded by the Rev. Henri A. Junod, of the Suisse Romande Mission. With other lots of minor importance obtained from dealers, all these contributions made a collection sufficient to characterise the fauna under discussion. Differing in this respect from the paper of 1908, the present one is entirely original; supplementary notes have been restricted to an appendix, and all descriptions and figures are made from actual specimens in the various collections mentioned.

But even now the work remains fragmentary. Nothing can be said about the natural surroundings of the various species, their manner of life and development, their place and value in the insect life of their surroundings. It is the author's ambition that these lines may awake sufficiently the interest of some resident entomologist to have these lacunae eventually filled by observation and record. Although no nymphs or larvae of dragonflies are at hand from the country under discussion, except that of *Chlorolestes conspicua*, see p. 445, it was found desirable to give an idea of what these nymphs are; the examples were taken from the writer's own country, and they may serve their purpose inasmuch as they are taken from groups represented in South Africa either by identically the same or by very closely allied genera.

No general history of the Order Odonata is attempted, and it is supposed that the more important facts of the external and internal anatomy of insects are known to the student. Only such particular structures are illustrated as are most characteristic of the Order and important in its classification, namely the head, thoracic segments, venation of wings and external genital organs of both sexes.\*

Thus the essential part of this paper is systematic, descriptive and faunistic. The faunal limits have been drawn somewhat artificially and also purposely; they embrace the States of the South African Union, but materials from the contiguous Portuguese Colony and from Rhodesia are also included as far as they were found in the collections under study.

\* Since the present paper was written, most fortunately a model text-book has been given to the student of Odonata, where every aspect of the organisation, physiology, ecology, etc., of this order is discussed and illustrated by a very large number of original figures: 'The Biology of Dragonflies,' by R. T. Tillyard, Cambridge, 1917 (Cambridge Zoological Series).

The question then arose whether an extensive enumeration of synonymy and bibliography should be added to the descriptive part; the addition would not have been difficult, because the writer has at his disposal a very detailed manuscript catalogue of all described recent Odonata. But after mature reflection it was found that for the present paper and its special purpose this would be of no practical value. It would have been a repetition of a great amount of material already published, some of it quite recently. To the reader interested in this side of the study it may be said that (1) the sources of the original descriptions can be easily traced by the aid of Kirby's well-known and indispensable catalogue; (2) as to the additions up to 1907, all bibliographical notes interesting South Africa have been collected and published in the writer's catalogue for L. Schultze's voyage, mentioned at the beginning of this introduction and published in 1908; (3) for the entire subfamily Libellulinae the writer's monograph of this subfamily gives a very detailed and, as far as possible, complete bibliography; it would have been tedious and useless to repeat this here. For these reasons the synonymy and bibliography are abandoned, and the quotations limited to the author's name and the year of publication of each specific and generic name. The writer wishes to indicate here his opinion regarding authors' names in zoological nomenclature. Authors' names should not be considered as part of the animal's name, as is largely accepted, but simply as a citation in a conventionally abridged form. Under this view any author is free to extend the citation to other details besides the name of the first describer, such as the year of publication; and no doubt this has a certain historical interest, giving as it does an abridged sketch of the chronological development of knowledge. The ideal would be, according to the writer, to abandon authors' names altogether, and for a group or a fauna sufficiently known to a broader public, or for a paper specially intended for those already initiated, this may be perfectly admissible even in the actual state of knowledge. But it would not have been advisable to have followed this method for this paper, which aims to be an introduction to an insufficiently known and as yet very imperfectly studied fauna.

## I. INTRODUCTION AND TERMINOLOGY.

Dragonflies have retained the essential parts and segmentation of a primitive insect or Hexapod through a long series of geological periods. Far back in the Mesozoic age they were essentially what they are now, and the systematic groups of the present time are

curiously foreshadowed even in those remote ages. But evidently they represent a type of adaptation without any reduction of parts, which was in its way a definitive and ideal solution of a mechanical problem, fully as efficient as widely different solutions that involve a far greater modification of the primitive insect plan, as, for instance, the most highly specialised groups of *Lepidoptera*, *Diptera* or *Hymenoptera*. Indeed, a living dragonfly of the larger kinds, in full vigour,

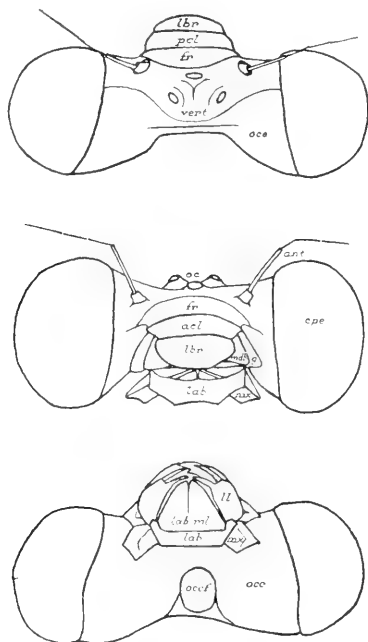


FIG. 1.—*Chlorolestes longicauda*. Dorsal, frontal and ventral views. *fr.* Frons. *vert.* Vertex. *occ.* Occiput. *occf.* Occipital foramen. *cpe.* Compound eye. *oc.* Ocelli. *ant.* Antenna. *lab.* Labium. *lab. ml.* Median lobe. *lab. ll.* Lateral lobe. *lab. mand.* Mandible. *g.* Gena. *lbr.* Labrum. *acl.* Anteclypeus. *pcl.* Postclypeus.

is one of the splendours of Nature in the skill, grace and sustained strength of its movements, the gay colours of the slender body, the strong lace-like wings, which are seldom ornamented, and mostly nothing but wings. Curiously enough, our poor human attempts to construct an inanimate flying thing resemble, if anything in Nature, a dragonfly.

The three essential parts of the insect body—head, thorax and abdomen—all have characteristic features in the Odonata.

The *head* is distinguished by the extreme development of the com-

pound eye. Vision is evidently the dominant sense of the dragonfly ; parallel with the hypertrophy of the eye we find an extreme reduction of the antennae—the organs of scent. A similar combination is found in the Order Ephemeridae or Mayflies, and to some degree in many of the more highly specialised Diptera. The configuration of the compound eyes largely affects in dragonflies the arrangement of the other parts of the head, and a better idea than any description can

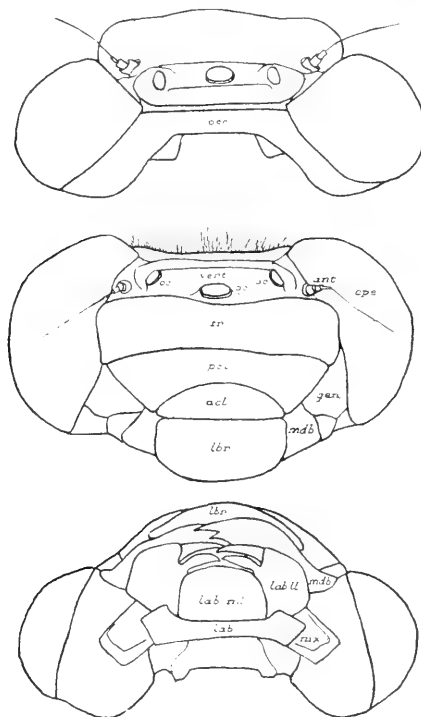


FIG. 2.—*Podogomphus praetorius*. Dorsal, frontal and ventral views of head. Lettering as in Text-fig. 1.

give will be conveyed by our Text-figs. 1–3, where three modifications are shown: the zygopterous head with widely separate, almost hemispherical eyes, in Text-fig. 1; the Gomphine head, which is intermediate between the zygopterous and the regular anisopterous configuration in Text-fig. 2; the Libelluline head in Text-fig. 3 is a representative of this fully developed anisopterous configuration, where the eyes meet in the median line for some length. Three ocelli are present in the entire order; their position is open in the

Zygoptera (Text-fig. 1); covered by a special structure, the frontal vesicle, in the Libellulidae and Aeschninae (Text-fig. 3); surrounded by sculptures of various development in the other subfamilies of Anisoptera (Text-fig. 2). Nothing certain is known about their special function.

The mouth-parts correspond to their masticatory function in the primitive insect type; they are of the regular three pairs—labium,

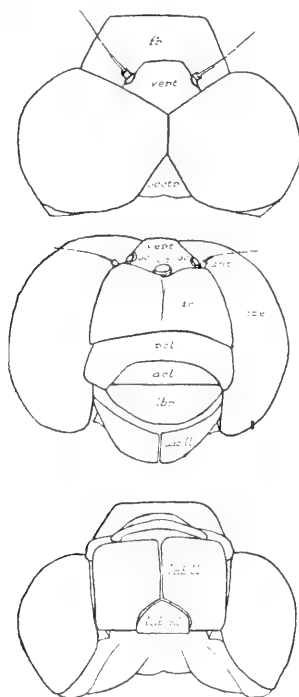


FIG. 3.—*Trithemis arteriosa*. Dorsal, frontal and ventral views of head. Lettering as in Text-fig. 1. *occtr.* Occipital triangle.

maxillae and mandibles—the labial and maxillary palpi being much reduced (or modified?), the mandibles particularly strong. Their size is relatively small in the Zygoptera (Text-fig. 1), but they are very much stronger in the anisopterous line (Text-figs. 2, 3). The labium is a very highly specialised structure in the family Libellulidae (Text-fig. 3), being a spoon-like or mask-like organ, which covers the entire mouth from beneath by the greatly developed lateral lobes, their free mesial borders being connected in a long and straight line. The other groups of Anisoptera (Family Aeschnidae) remain true to



the zygoterous type of this organ, and thus nearer to structures generally found among insects with masticatory mouth-parts.

The frontal, vertical and occipital sclerites are mostly not easily distinguished in the fully mature insect, but as a matter of convenience in all the groups the part bearing the antennae and ocelli, the fronto-vertical complex, may be termed, in an abridged form, "the frons"; what is posterior to it may be named "the occiput."\*

The latter especially is subject to great modification in consequence of the development and disposition of the eyes. Largely visible in a dorsal view in *Zygoptera* and *Gomphinae* (Text-figs. 1, 2), it is reduced in this view to a mere trace, in other *Anisoptera* (Text-fig. 3), where the occipital triangle and just a small margin on the posterior side of the eye are the only parts attributable to the occiput. Its ventral view is also chiefly determined by the shape of the eyes; only in the *Zygoptera* is the occipital foramen (Text-fig. 1) visible in a strictly ventral view; in *Anisoptera* the foramen is drawn forward by the globose form of the head and covered from beneath by the basal pieces of labium and maxillae.

Whereas the fronto-occipital suture is obscure and often uncertain, there is a very distinct suture between the frons and the sclerites anterior to the frons. There are three of these transversely disposed. The first, from the anterior pole, is the labrum or upper lip, which partly covers the mouth-parts from above, but not entirely; part of the mandibles (or even of the maxillae) remain free and partake of the colour differentiation of exposed parts. The second is the anteclypeus, the third the postclypeus. Labrum, anteclypeus and postclypeus are disposed very nearly in the same vertical plane in the *Anisoptera*, which plane is continued dorsally by the frons. As a rule there is here an inflection, with or without a ridge, to the horizontal plane within the frons itself (only some of the *Gomphinae* do not clearly show the fracture in the frons), as shown in Text-figs. 2 and 3. In the *Zygoptera* the labrum is very nearly horizontal, the anteclypeus vertical, the postclypeus horizontal again; and from the suture of postclypeus and frons this latter rises mostly in a gentle curve to give a nearly horizontal position to the fronto-occipital complex, the ocelli looking upward. Something similar to the transverse frontal ridge of most *Anisoptera* may exceptionally be observed in the *Zygoptera* (*Ceriagrion*). Between the lateral margin of ante- and postclypeus

\* For details of the rather complicated structural homologies of the exoskeleton of the head special handbooks of anatomy must be consulted; their discussion would exceed the aims of this summary introduction.

and the eye there are small, roughly triangular sclerites, the genae, well developed in the Gomphinae, small in the other Anisoptera, large but not distinctly limited towards the frons in the Zygoptera. The anteclypeus and postclypeus have often been named "nasus" and "rhinarium" respectively; but the writer always found it difficult to distinguish between the nasus and the rhinarium, since the two terms apply to the same thing in Latin and in Greek respectively; the significative terms "ante"- and "postclypeus" seem preferable for obvious reasons.

The antennae are mere rudiments, as shown by our figures; their value for systematics and description is not important.

The *thorax* of Odonata is highly characteristic of the Order, and a wonderfully elaborate adaptation to the needs of an aerial creature that finds its food on the wing, will in very many cases even eat without alighting, will play and mate and sometimes even oviposit in flight. The first thoracic segment, the prothorax, is separated from the two following wing-bearing segments by an extremely loose joint, similar to the joint between head and prothorax; both these joints are largely moveable in every direction, together giving to the large-eyed head a remarkable freedom of movement. The prothorax as a whole is very small, and its single sclerites not easily recognisable. The other segments, the mesothorax and metathorax, are joined to form a strong and solid unit, compact in outline and with the sutures firmly soldered, so as to form a strong support for the wings as well as an ample box for the vigorous muscles. The specific feature of Odonata in this structure is the reduction of sternites and especially of tergites and the extreme development of the lateral sclerites, the episterna and the epimera of each segment. These lateral sclerites being, moreover, placed with their longer, dorso-ventral axis in an oblique position, the lower end cephalad, the upper caudad, another most important feature of the Odonata thorax results, viz. the throwing forward of the coxae and legs well in front of the wing bases, almost under the head and the mouth. This position of the legs, unique among insects, explains the position of rest adopted by most dragonflies, this position being not one of sitting, but rather of suspension. Also it is in strict correlation with their feeding habits, as Dr. Wesenberg-Lund, of Hilleroed, very justly remarks in a recent paper.\*

The feet have for function the holding of the prey, when, as is very often the case, the dragonfly eats an insect just captured without

\* C. Wesenberg-Lund, "Odonaten-Studien," 'Internat. Rev. ges. Hydrobiol.', 1913, pp. 155-228, 373-422.

interruption of flight. The thoracic sutures, as given in our Text-figs. 4 and 5, show clearly the homologies of the parts. In the Zygoptera all the sutures drawn in Text-fig. 4 are visible in many cases, though there are genera and groups where the first lateral suture is obliterated, at least in its upper half. In the Anisoptera this suture disappears regularly upward from a level which corresponds approximately to the metastigma; but the homology of parts is not seldom still visible in the disposition of the colours and

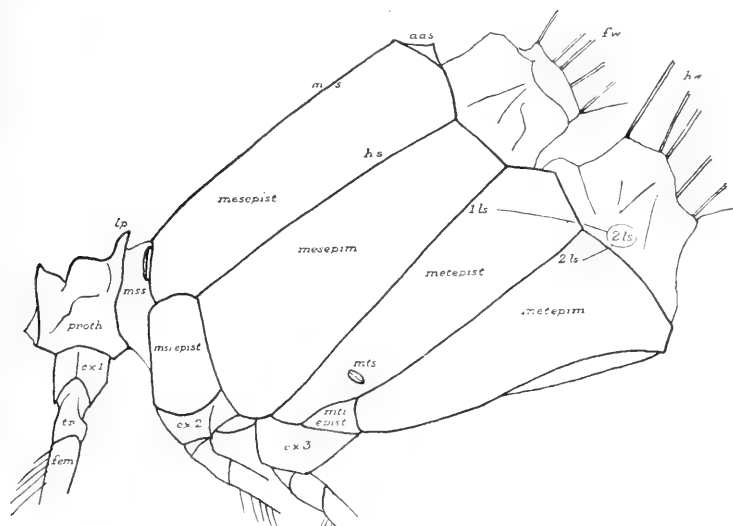


FIG. 4.—*Phaon iridipennis*. Lateral view of thorax. *proth.* Prothorax. *lp.* Posterior lobe of prothorax. *cx.* Coxa. *tr.* Trochanter. *fem.* Femur. *mesepist.* Mesepisternum. *mesepim.* Mesepimeron. *metepist.* Metepisternum. *metepim.* Metepimeron. *msiepist.* Mesinfraepisternum. *mtiepist.* Metinfraepisternum. *ms.* Median suture. *hs.* Humeral suture. *1ls., 2ls.* First and second lateral sutures. *mss.* Mesostigma. *mts.* Metastigma. *aas.* Antealar sinus. *fw.* Forewing. *hw.* Hindwing.

pattern. There are two pairs of respiratory stigmata on the thorax: the mesostigma is in a concealed position in the joint between the pro- and mesothorax, and the metastigma is comparatively large and a leading feature in the structure and pattern of the thoracic side.

The feet are slender, though comparatively strong, spiny, with various adaptations of their armature, according to systematic position and sex. The coxae are free, relatively small, the trochanters double; the femora and tibiae of about equal length; the tarsi short, three-jointed; the claws mostly with a tooth on their ventral edge.

The wings bear neither hair nor scales, only some minute, almost

microscopic stiff bristles along the veins; when coloured the various tints result from the pigmentation of the wing membrane itself, or from some waxy exudation. The pigmentation mostly results in tints from clear yellow through brown to deep black, often with metallic lustre; in some cases also blood-red may occur. Waxy exudation produces an opalescent white, or bluish when on a background of black. But the immense majority of the dragonfly wings are hyaline or bear only small basal coloured spots.

The venation of these wings is of the utmost importance to the systematist. From the early times of odonatology some of the more

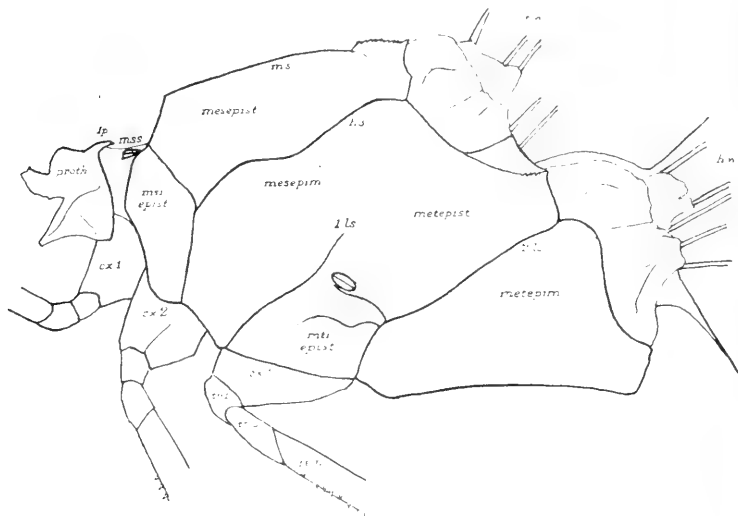


FIG. 5.—*Crocothemis erythraea*. Lateral view of thorax. Lettering as in Text-fig. 4.

obvious features have been adopted as distinctive characters for the larger systematic units; but in more recent times patient investigation of many minute (but often morphologically significant) details has shown that characters for the smaller groups, down to genera and sometimes even to species, may be drawn with great advantage from the neurulation. An advantage is to be found in these characters being common to both sexes of one species or genus (unlike many other important distinctive characters in dragonflies), and in their being easily described and exactly figured, especially by photography. The introduction of photography into the descriptive scheme of our modern odonatological literature is undoubtedly one of its distinctive features when confronted with the writings of the classical time, and

the writer considers this introduction as a marked progress. Besides being of comparatively easy application, the study of venational details has the great merit of leading very often to the true lines of development within the Order, of helping us to a really phylogenetic, and therefore natural classification—all due reserve being made, of course, for incomplete knowledge and possible, or even probable, mistakes. The greatest progress in this branch of study is due to a paper of J. C. Needham, of Ithaca, New York: "A Genealogic Study of Dragonfly Wing-Venation" ('Proc. U.S. Nat. Mus.,' xxvi, pp. 703-764, tab. 31-54, 1903); from this essay most or all of the more recent authors have taken their starting-point, and its terminology has rapidly become almost universally adopted. This terminology, with some very slight and merely formal modifications, made as the writer found them practical in his various studies on the subject, is here also adopted and illustrated in its main features in Plate V, figs. 1, 2.

Prof. Needham's studies of venation were made chiefly on the wings of the Suborder Anisoptera, and interpretations of doubtful structures and terminology were therefore immediately derived from observations of this systematic unit. Needham arrived at his conclusions by following the ontogenetic development of wing-venation as foreshadowed in the tracheation of the larval wing; by his text and beautiful photographic figures the following facts were emphasised as being more especially characteristic for the (Anisopterous) Odonate wing: (1) A branch of the radius (*R*), the single radial sector (*Rs*) present in Odonata, branches off from the main trunk in the nodal region, crosses in an oblique transverse direction over two branches of the media (*M1* and *M2*) before taking up again the longitudinal direction; the point where *Rs* becomes longitudinal again is linked to a considerably more proximal level of branch *M1*-2 by an accessory structure of veins named "the bridge" by Needham. In the mature wing *Rs* would appear to the observer unacquainted with the larval conditions as a branch of *M*; but there is an absolutely constant oblique cross-vein behind *M2* and a little distally from the nodus to indicate still what has taken place during the development. (2) The discoidal triangles of the basal part of both wings—structures already observed and named by early observers—are demonstrated to be built up as follows: The proximal side of the triangle is part of the main branch of the cubitus (*Cu*); the costal and distal sides of the triangle are medio-cubital cross-veins modified in length, structure and final position in various ways, according to systematic group and to differences between front and hind wing; but the modifications are evidently determined by the mechanical needs of the wing structure.

(3) The conditions of the anal vein (*A*) were not insisted upon by Needham either in his diagrammatic figures or in his terminology, though they are clearly demonstrated in some of his photographic figures (*l. c.*, pl. xxxi, fig. 1, pl. xxxii, fig. 2). What we are used to name the cubito-anal cross-vein appears, indeed, to be part of the main branch of *A* itself. The trachea, *A*, in the larval wing is, in its proximal part, fused with, or indeed very closely applied to, *Cu*; where it gives up this fusion to bend hindward we have the "cubito-anal cross-vein," and the part of *A* in the mature wing proximal to this vein appears indeed as a recurrent secondary branch of *A*—as a kind of "bridge" again. Recently Mr. R. J. Tillyard has developed and illustrated these conditions, and proposed to draw the consequences for the purpose of terminology ('Proc. Linn. Soc. N.S. Wales,' xxxix, pp. 163 *sqq.*, 1914).

Needham and others, the writer amongst them, have applied the results drawn from the anisopterous wing to the interpretation and terminology of the Zygopterous wing. There is no need here to insist on the conditions of the wing base, much less complicated in the Anisoptera by a minor grade of specialisation of the region between *M* and *Cu* (quadrangle instead of triangle and supratrangular space) and also by the reduction of *A* to an almost rudimentary state. Applying the anisopterous terms to the Zygopterous wing (from apex to base; *R*, *M1*, *M2*, *Rs*, *M3*, *M4*), we have full accordance between the two large groups; but the conditions of these various branches at their origin, especially in the nodal region, are far from giving a satisfactory insight into their primitive interdependence (insight which is by no means difficult to obtain in the mature anisopterous wing). A larval wing of *Lestes* (*l. c.*, pl. xxxi, fig. 2) gave apparently the key to the question, confirming the full analogy between an anisopterous and a zygopterous wing; the oblique vein (in the larval and in the mature wing) and the long radio-medial bridge are clearly there, and it might be overlooked that the proximal part of *Rs*, its origin out of the main branch of *R*, is altogether absent. But this detail and other embarrassing disagreements in the Agrionine wing and in some of the Calopterygidae might provisionally be accepted as being the consequences of coenogenetic differentiation by reduction. The writer gradually became sceptical about this entire interpretation of the zygopterous wing on the "Anisopterous" scheme. When discussing the position of *Chlorolestes* (in Agrioninae or Lestinae) with Mr. Herbert Champion, in consequence of observations first made by this gentleman when studying some genera of Calopterygidae (*Philoganga*, *Bayadera*), and discussing analogous questions with Mr.

Tillyard in a spirited correspondence, he felt the desirability of new observations and probably of a different orientation. Larval preparations of *Calopteryx* and of *Ischnura* were photographed, compared with various other important photographs furnished by Mr. Tillyard (*Lestes*, *Synlestes*, *Pseudagrion*, *Neosticta*, etc.), and the following conclusion was arrived at provisionally, and for which Mr. Tillyard and the writer alone have to accept for the present the responsibility: (1) Zygoptera are radically different from Anisoptera, having the radius unbranched in larval and mature wing; what has been termed *Rs* is, in fact, a branch of the media. (2) This particular branch of the media (*Rs* of our terminology) has undergone the following (gradual) changes of position: (a) a very proximal origin in the quadrangular region (most primitive position—*Calopteryx* and many others of the Calopterygidae); (b) considerably more distal origin, very near the nodus (the bulk of Agrionidae); (c) still more distal origin, shifted so far distally as to become a secondary branch of the following branch (*M2*) of the media. In this condition a bridge (a very long one in *Lestes*, a shorter one in *Chlorolestes* and *Synlestes*) appears between this "*Rs*" and the main branch of the media (the structure thus resulting in an apparent analogy with the anisopterous condition, though actually different). Under this assumption (unbranched radius, distally migrating branch of media at place of anisopterous [*Rs*]) most of the difficulties of interpretation vanish for the mature as well as for the larval zygopterous wing, and as far as the writer's observations go, all ontogenetic preparations, even of earlier stages (*Calopteryx* and *Ischnura*), are fully in favour of this theory and none contrary to it.

Nevertheless I hesitate to draw conclusions from this view in proposing a new terminology for the Zygopterous wing. Mr. Tillyard has done so, and says: "*Ms* in Zygoptera for the vein in place of *Rs* in Anisoptera." Fortunate as this term appears to be, I refrain from accepting it, as long as the question is not fully settled by the discussion that must certainly follow.

The *abdomen* is joined to the thorax in a free but rather broad joint. It is composed of ten fully-developed segments of subequal value, although the first and the last are somewhat reduced in size, and the second, eighth and ninth distinguished by their relation to sexual organs. The dorsal sclerites, the tergites, are predominant; the lateral and even part of the ventral surface belong to the tergite. The ventral sclerites, the sternites, are, as far as not modified in the genital segments, narrow, flat plates, mostly of indifferent structure and colour, folded under the ventrally produced margins of the

tergites, to which they are joined by a thin, transparent, completely infolded membrane. There are rudiments of an eleventh abdominal segment: supra-anal tubercle in female, superior appendage in male of Anisoptera as rudiments of the tergite; subanal plates in Anisoptera, inferior appendages in male of Zygoptera as rudiments of the sternite. The superior appendages of both sexes in the entire Order are considered by most authors as being appendages—cerci—of the tenth segment.

The disposition of copulatory organs in the male is another distinctive and unique feature in the Order Odonata. The opening of the seminal vessel is constant, on the eighth sternite, covered by a pair of small, roughly triangular, slightly projecting plates. But the copulatory organ is to be found on the second and third segment, where a complicated pocket is formed of elements of the second sternite, and a penis-like organ projects from the framework of the second sternite in Zygoptera, and from the anterior margin of the third sternite in Anisoptera. No detailed account can be here given of these very complicated structures (*cf.* Erich Schmidt, "Vergleichende Morphologie des ii und iii: Abdominal segments bei männlichen Libellen," 'Zool. Jahrb. Anat.,' xxxix, pp. 87-120, tab. 9-11, 1915). No use, for diagnostic purposes, is here made of them in the groups Zygoptera and Aeschninae; but they are of great importance and comparatively easy application in Gomphinae and Libellulidae. The Gomphinae show in the appendages of the second sternite (1) a small anterior lamina, (2 and 3) two pairs of hamuli, in the third sternite (4) a cap-like organ which covers the penis, and (5) the penis itself. In the Libellulidae the anterior lamina is somewhat more important and only one pair of hamuli is present (the first pair is, as it appears, fused to the anterior lamina); the ventral margin of the second tergite is mostly produced in a flat organ, the genital lobe; between the genital lobes the penis is included, and no cap-like organ of the third sternite exists.

In the female no modification exists on the second segment. The organs of copulation and oviposition have their regular position on the eighth and ninth sternites; eventually a modification of the tenth partakes of the function. There are two rather widely different types of organisation. The more simple type shows the genital opening at the posterior end of the eighth sternite, either practically free, or covered by a very simple chitinated plate, which is very often bifid to various degrees; the vulvar scale; on the ninth sternite only two minute styles or tubercles can be observed. This type is common to the large family Libellulidae and to the Gomphinae in the Anisoptera.



The other type shows an elaborate boring mechanism, a terebra very much like the same organ in many other groups of insects (Hymenoptera, Tenthredinoidea, Orthoptera and others). There are two pairs of slender, acute saws, the lateral and somewhat anterior ones belonging to the eighth sternite, the medial, posterior and smaller ones to the ninth sternite. All four are, when out of function, included between a pair of valves, derived from the ninth sternite, and bearing each a slender, small, one-jointed process near its end. This terebra is common to the entire Suborder Zygoptera and to the Aeschninae in the Anisoptera. Its presence means that the insect will deposit its eggs singly into holes made in dead or living plant tissues, in the water or only near it, as the case may be. The eggs of the valvulate groups, on the other hand, are laid entirely unprotected, or only included in a mass of gelatinous matter or jelly, like frogs' eggs.

The relative position of the copulatory organs in both sexes involves a complicated act of copulation. This act has attracted the attention of naturalists from a very early time, and has often been described. Nevertheless the knowledge of its more intimate details is of recent date only. The most elaborate description, based on the statements of other observers and a great many personal observations, is given by Dr. Wesenberg-Lund in his paper already mentioned. The act may be briefly described as follows: The male seizes his mate first with his spiny feet, takes for a moment a position on the head of the female, at which moment the spermatie fluid is transmitted from the opening on the eighth to the copulatory apparatus on the second segment; then the male takes hold of its mate by the terminal appendages, which are applied to the prothorax in Zygoptera, to the head in (at least most of) the Anisoptera; the female, somehow aided by the male, curves her abdomen so that her genital opening will join the male's second sternite, and the act is thus consummated. In most cases its later stages take place on some supporting plant or even on the ground; but there are some curious and most remarkable cases (*Libellula quadrimaculata* and *depressa* of the European fauna), where the entire complicated function is performed when the two actors continue their rapid flight, and in these cases it lasts only a few seconds. In other cases it may last even for hours.

Oviposition is also a very attractive study for the thoughtful observer, and various different manners are described, the chief difference being given, as already indicated, by the different structure of the female organs; but other differences scarcely less interesting result from the local and seasonal conditions of each species.

## 2. SYSTEMATIC AND DESCRIPTIVE PART.

## I. SUBORDER ZYGOPTERA.

Front and hind wings similar in outline and also in venation (except for some minute details). In the basal part of wings between *M4* and *Cu* the quadrilateral (*q*), the proximal side of which is the anal half of the arculus; the quadrilateral free or crossed.

Head transversely cylindrical, the hemispherical eyes separated by a broad space, broader than the length of the diameter of each eye. Median lobe of labium broader than lateral lobes, more or less bifid. In the male sex two pairs of terminal abdominal appendages, the lower pair being the sternite of the eleventh abdominal segment. Female ovipositor consisting of two pairs of saws and a pair of valves (p. 259).

## II. SUBORDER ANISOPTERA.

Front and hind wings dissimilar in outline and venation: the anal field is more developed in the hind wing. The difference in the triangular region of the front and hind wings is slight in the first family of the Suborder, considerable in the second. Between *M4* and *Cu* in the region of the zygoterous quadrilateral there are two spaces superposed in the transverse axis of the wing—the supra-triangular space (*ht*) and the triangle (*t*); the proximal side of *ht* is the anal half of the arculus. Head roughly hemispherical or spherical in outline. In the male sex a pair of superior terminal abdominal appendages, and a single (often bifid) inferior appendage, being the tergite of the eleventh abdominal segment.

## I. SUBORDER ZYGOPTERA.

There is a marked difference in general appearance between a zygoterous and an anisopterous dragonfly. With very little experience the observer will distinguish at a glance to which of the two large and systematically equivalent groups a given insect may belong. Zygoptera are comparatively weak insects; their long and extremely slender body, long and mostly very narrow, even petiolate, wings are not suited to the wonderful display of flying power shown by many of the Anisoptera. Their existence is more bound to the immediate surroundings of their native waters, where they cling to the vegetation, take rather short flights, will rarely go very high up into the air

although these tiny and fragile looking creatures are occasionally capable of very rapid movements. Their shape and coloration are in most cases highly cryptic in their natural haunts. Under the influence of conditions resulting from the full sunlight on open space, reflected from the water's surface, or broken into the intricate maze of vegetation, even their bright colours—metallic green, light azure blue or vivid blood-red—cease to be conspicuous, and often vanish to a point which is a just cause of admiration to an observant mind.

In the fauna under discussion there is a fair representation of the Suborder, and it is probable that a certain number of species will be added to our list as the result of a more thorough investigation of the country.

There are representatives of two families :

- A. Numerous antenodal cross-veins (*Anq*); the nodus distant a long way from the wing base. Quadrilateral (*q*) nearly rectangular, long, crossed by one or more veins (Plate VI, figs. 6, 7) . . . . . *Calopterygidae*.
- B. Two antenodal cross-veins only; the nodus near the wing base. Quadrilateral a single cell, nearly rectangular, or oblique in various degree (Plate VI, fig. 8, etc.) . . . . . *Agrionidae*.

## 1 A. FAMILY CALOPTERYGIDAE.

This family is poorly represented in our fauna by two species belonging to very widely removed genera.

- a. Wings petiolate (*i.e.* the vein *A* is for a short extent the actual hind margin of the wing). Two of the antenodal cross-veins are decidedly stronger than the rest, and run right through from *C* to *R*. Quadrilateral two-celled. *M* 4 strongly convex costal.  
A long and narrow pterostigma present in both sexes (Plate VI, fig. 6). Ante- and postclypeus much enlarged, projecting in a helmet-like structure . . . . . *Libellago*.
- aa. Wings not petiolate (*i.e.* there is a narrow anal field between vein *A* and the actual hind margin of the wing right from the base). All antenodal cross-veins about equal, and most of them running through from *C* to *R*. Quadrilateral long and narrow, rectangular, with 5-6 cross-veins. *M* 4 straight. Only exceptionally, and in the male sex alone, a small pterostigma, scarcely larger than two or three cells (Plate VI, fig. 7). Head of the regular zygopterous form . . . . . *Phaon*.

### LIBELLAGO (Sclys, 1840).

This genus is in Africa the representative of de Sclys' "Légion Libellago," a group of Calopterygidae that might eventually rise to the rank of a subfamily.

The peculiar structure of the head, the very characteristic venation of the narrow, petiolate wings, as represented in our Plate VI, fig. 6, are distinctive features of the "Légion." This group is represented in tropical Asia by the large genera *Rhinocypha* and *Micromerus*, in Africa by the almost equally numerous genus *Libellago*.

Most of the species are found in tropical Western Africa, but they are very imperfectly known, because specimens are not numerous in collections and the existing descriptions are in a state of hopeless confusion. The only species found in South Africa has a wide distribution in East Africa, but does not occur, as it seems, on the other side of the continent. The generic name will eventually have to be altered, as it seems that the name *Libellago* must, according to nomenclatorial rules, be applied to what is now universally accepted as *Micromerus* (Rambur, 1842); but the present paper is not the place for such an alteration.

A larva from the Tanganyika region (Mus. Tervueren) agrees in all essential points with another one figured by Karsch ('Berlin. Entom. Zeitschr.', xxxviii, tabs. 1, 2, 3, 4, fig. 11, 1893); it is almost certainly a *Libellago*.

The Tanganyika nymph is reserved for another publication.

#### LIBELLAGO CALIGATA (Sélys, 1853).

S. Afr. Mus.: 1 ♂, Kranspoort, Pretoria district, Transvaal (17. xii. 1906); 1 ♂, Waterfall, Transvaal (5. xii. 1901); 25 ♂, 15 ♀, M'Fongosi, Zululand (ii, iii, iv, v, x, xi, xii. 1911 (W. E. Jones); Acornhoek, Transvaal (xii. 1918, Tucker). Mus. Stockholm: 2 ♂, Zululand (x. Trägårdh). Coll. K. J. Morton: 1 ♂, 1 ♀, Umzinto, Natal (26. iv. 1909, Miss Fountaine). Coll. E. B. Williamson: 10 ♂, 9 ♀, Princetown, Natal (8, 14. xii. 1908; 5. i, 16, 19. ii, 11. iii. 1909; 16, 21. ii. 1910, G. F. Leigh). Coll. Ris: 1 ♂, Amans, Natal (23. iii. 1908, H. Junod).

♂ (adult). Head deep black. Labium reddish brown, darker at the tips. Dorsally three yellowish spots; a larger one from the occipital margin almost to the posterior ocelli and in two lateral points to the base of antennae; two small triangular ones between the median spot and the eyes, nearly in the position of the "postocular spots" of many *Agrionidae*.

Thoracic dorsum deep black; a narrow white line on the median suture, and a triangular white spot in the antealar sinus and a broad forked yellowish band at the humeral suture; the lateral branch touching the narrow black line of this suture nearly for its whole

length, the median branch terminating in a point at two-thirds of its height. Sides yellowish (or reddish in life?); a rather broad and almost complete black mesepimeral band; a narrow black line in the dorsal third of the first lateral suture; a broader black line on the second lateral suture for its entire length. Ventral surface yellowish with very narrow black lines on the sutures. Femora black; tibiae foliaceous, lanceolate, bright scarlet red on the outer, pure white on the inner surface; tarsi black.

Abdomen short, depressed, not much narrower than the thorax at the base, very gradually narrowing to the end. Dorsum light blue (often badly discoloured in dead specimens); sides of segments 1 to 3 crimson; ventral side of 1 to 3 crimson with a blackish hue, 4 to 10 blackish.

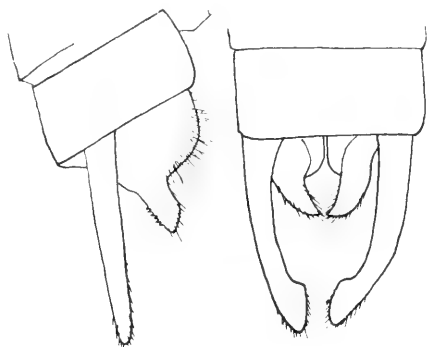


FIG. 6.—*Libellago caligata*, ♂. M'Fongosi. Appendages, right side and dorsal view.

Black markings on dorsum: Segment 1 a triangular dorsal spot; 2 a longitudinal dorsal line and an incomplete transverse line near the segment's end, a latero-ventral somewhat diffuse longitudinal band; 3 a U-shaped dorsal marking, a narrow medial dorsal line and an almost complete latero-ventral longitudinal band; 4 narrow nearly rectangular transverse apical spots; 5-6 the trace of a transverse ante-apical line; 7-10 wholly blue. Appendages deep black (Text-fig. 6).

Wings hyaline; a yellowish tint of the base gradually vanishing towards the quadrilateral. Pterostigma blackish at the ends, dark reddish brown in the centre. Venation (Plate VI, fig. 6).

Teneral males are much like females in colour and pattern of head and thorax; dull grey or violet on the dorsum; yellowish on the sides of segments 1-3 of abdomen. Their dilated tibiae show various tints of pale yellow on the inner, of yellow or orange on the outer side.

♀. Labium whitish yellow. Labrum yellow, rather broadly black

at base, and this colour extending in a median line; mandibles and genae yellow; anteclypeus yellow with a U-shaped black marking; dorsum of head (postclypeus and fronto-occipital region) mostly yellowish with an olivaceous tinge; the part between the eyes to the base of antennae shows the male pattern; only the lateral branches of the medial spot are very nearly fused in front of the anterior ocellus; the part in front of the antennae, the basal joints of antennae and the postclypeus are largely olivaceous, with narrow black lines in the depth of folds and suture.

Thoracic pattern much as in male, the black colour somewhat reduced, the light colours dorsally dull olivaceous, passing into light greenish yellow on the sides.

Feet blackish with grey pruinosity; outer side of tibiae light yellowish; no dilatation of tibiae.

Abdomen comparatively shorter than in male, less flattened, more nearly cylindrical. Dorsum dull olivaceous brown, with black markings: Segments 1-3 as in ♂; 4-7 a U-shaped marking and a median dorsal line; dorsum almost entirely black; 1-8 a broad latero-ventral longitudinal band, fused to the dorsal black colour on 9-10. Ventral side: Sternites black, tergites olivaceous, bordered laterally with black; bluish pruinose in very adult specimens. Appendages black, straight, acute.

Wings longer than in male, often tinged with light yellow; pterostigma mostly whitish, dark brown to black at both ends. Venation (Plate VI, fig. 6).

♂, *Abd.* 21, *hdw.* 22, *pt.* 2 mm. ♀, 19, 25, 2.5.

#### PHAON (Sclys, 1853).

The genus represents in South Africa the Sclysian "Légion Calopteryx," which division, like the "Légion Libellago," may eventually rise to subfamily rank. There are two other closely allied genera (*Sapho* and *Unma*) in tropical Africa and the "Légion" is represented in most of the great faunal regions.

The earlier stages of *Phaon* are unknown; but it is to be expected that the larva will not be essentially different from allied forms which have been described, such as *Calopteryx* from Europe and North America, *Neurobasis* and *Vestalis* from tropical Asia.

#### PHAON IRIDIPENNIS, Burmeister, 1839.

S. Afr. Mus.: 7 ♂, 5 ♀, M'Fongosi, Zululand (ii, iii, v, x, xii, 1911, W. E. Jones); Kaapmuiden, Transvaal (xii, 1918, Tucker).

Rhodesia Museum: 1 ♂, Lusita River, Zambesi, Rhodesia (v. 1912). Mus. Stockholm: 1 ♂, Natal (Tragardh). Coll. E. B. Williamson: 1 ♂, 3 ♀, Salisbury, Mashonaland (iv. 1900, G. A. K. Marshall); 1 ♀, Umtali 3700 ft. (x. 1900, *id.*); 10 ♂, 5 ♀, Natal (G. F. Leigh); 1 ♂, 2 ♀, Woodside off Umbilo Road, Congella, Natal (*id.*).

Widely distributed, and, as it seems, often common in Tropical Africa, West and East; a very slightly different form in Madagascar.

♂. Labium whitish. Occiput black, bluish pruinose. Upper side of head light reddish or greyish brown; a ring of brilliant metallic green encloses the region of the ocelli, broader laterally along the eyes, narrow on the occipital margin, narrow and sometimes interrupted in front of the ocelli.

Prothorax reddish brown, dorsum brilliant metallic green. Thorax reddish or greyish brown, lighter on the sides, almost whitish ventrally;

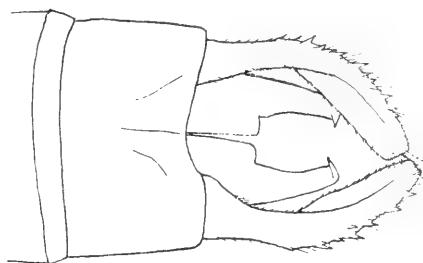


FIG. 7.—*Phaon iridipennis*, ♂. M'Fongosi. Appendages, dorsal view.

each side four metallic green stripes: the first, mesepisternal, the largest, almost rectangular and covering the sclerite to the narrow margins on the sutures; the second, mesepimeral, cuneiform, broadest ventrally; the third and fourth, metepisternal and metepimeral, also cuneiform, but much smaller and broadest dorsally. Feet reddish brown, tarsi and spines black; very long and slender, the tibiae curved; very numerous, extremely long and fine spines on the femora and tibiae.

Abdomen long and slender, cylindrical; dorsally dark brown with a slight metallic reflection, laterally reddish brown, ventrally blackish. Superior appendages slightly longer than the tenth segment, forcipate; inferior not fully two-thirds as long, nearly straight and parallel.

Front wings hyaline with a beautiful blue iridescence, costal margin and tips light yellowish; hind wings uniformly light yellowish; pterostigma, when present, light greyish brown.

♀. Similar to ♂ in ground-colour, but the metallic markings of

head and thorax are somewhat reduced in extent, the metepisternal stripes uncomplete or interrupted; their colour dark brassy or coppery with a slight greenish lustre. Wings almost uniformly yellowish, the colour duller than in the male and the bluish iridescence far less brilliant.

♂, *Abd.* 58, *hbw.* 38, *pt.* 1.5 mm. ♀, 53, 41.

## 1 B. FAMILY AGRIONIDAE.

1. Pterostigma comparatively large, covering two or more cells. Supplementary short sectors between the distal ends of some or most of the regular veins. Quadrilateral with the anal-distal angle very acute. (Plate VI, fig. 8, Plate VII, figs. 1, 2, 3, 4, 5, 6.) Spines of femora and tibiae long. Superior appendages of males forcipate . . . . . 2.  
Pterostigma small, covering one cell or less, only exceptionally more. No supplementary short sectors. (Plate VII, figs. 7, 8, 9, 10, Plate VIII, fig. 1.) Superior appendages of males not forcipate . . . . . 3.
2. Origin of *M3* and bridge of *Rs* nearer to the arculus than the nodus. Origin of *A\** at *Cuq.* (Plate VI, fig. 8) . . . . . *Lesles.*  
Origin of *M3* and bridge of *Rs* in the nodal region, predominantly *M3* at the subnodus and bridge of *Rs* one or two cells distally. Origin of *A\** distal to *Cuq.* (Plate VII, figs. 1, 2, 3, 4, 5, 6) . . . . . *Chlorolestes.*
3. Quadrilateral rectangular or very nearly so. (Plate VII, figs. 7, 8, 9, 10.) Spines of tibiae long . . . . . 4.  
Quadrilateral oblique, the anal-distal angle acute. (Plate VIII, fig. 1.) Spines of tibiae short . . . . . 7.
4. Origin of *A\** at *Cuq* or very little proximal, not more than the length of *Cuq.* (Plate VII, figs. 7, 8, 9) . . . . . 5.  
Origin of *A\** very considerably proximal to *Cuq.*, several times the length of *Cuq.* Quadrilateral slightly more oblique than (5) and shorter, approaching the form of (7). *Rs* at subnodus, *M3* proximal by one cell. (Plate VII, fig. 10) . . . . . *Metacnemis.*
5. *Cuq* fully developed, exceeding the level of nodus by a number of cells. Origin of *A\** at *Cuq.*  
*M3* at subnodus, *Rs* distal by one cell. (Plate VII, fig. 7) . . . . . *Allocnemis.*  
*Cu 2* incomplete or absent, exceeding the level of nodus at most by one cell. (Plate VII, figs. 8, 9) . . . . . 6.
6. *Cu 2* exceeding the distal side of quadrilateral by one cell in front wing, by two cells in hind wing.  
Origin of *A\** at *Cuq.*, *M3* at subnodus, *Rs* one or two cells distal. (Plate VII, fig. 8.) Abdomen excessively long and slender.  
*Chlorocnemis.*  
*Cu 2* not developed; *A\** stopping at the vein which continues the distal side of quadrilateral. Origin of *A\** slightly proximal to *Cuq.* *Rs* at subnodus, *M3* proximal by one cell. (Plate VIII, fig. 9.) Abdomen moderately long and slender . . . . . *Disparoneura.*



7. Origin of  $A^*$  at  $Cu_1$  or very slightly proximal, scarcely more than the length of  $Cu_1$ . Females without a vulvar spine at the sternite of segment 8 . . . . . 8.  
 Origin of  $A^*$  considerably proximal to  $Cu_1$ , more than the length of  $Cu_1$  . . . . . 9.
8. No transverse ridge at the frons. Most of the species with light-coloured postocular spots. Colour scheme mostly blue and black. Superior appendages of most species bifurcate. Most females with two small styles on the posterior border of prothorax . . . . . *Pseudagrion*.  
 Frons with a transverse ridge parallel to the suture anteclypeus-postclypeus. No postocular spots. Colour scheme orange or reddish. Superior appendages of male not bifurcate. No styles on female prothorax . . . . . *Ceriagrion*.
9. Arculus a long way distal to the second  $An_1$ .  $M_2$  in front and hind wing at third postnodal cross-vein.  
 Tenth segment of male not elevated at posterior margin. No vulvar spine in female. Smallest forms of family and order . . . . . *Agriocnemis*.  
 Arculus at second  $An_1$  or only very slightly distal. Females with vulvar spine . . . . . 10.
10.  $M_2$  in front wing mostly at fifth, in hind wing at fourth postnodal cross-vein. Tenth segment of male not or very slightly elevated at posterior margin. Pterostigma of male similar in front and hind wing.  
 . . . . . *Enallagma*.  
 $M_2$  in front wing mostly at fourth, in hind wing at third postnodal cross-vein. Tenth segment of male raised at posterior margin. Pterostigma of male black and white in front wing, of one colour only in hind wing.  
 . . . . . *Ischnura*.

## 1 BA. SUBFAMILY LESTINAE.

The cosmopolitan genus *Lestes* together with some smaller allied groups, not represented in the present fauna, are considered unanimously as a rather widely different stirps from the rest of the family *Agrionidae*. The authors of the present time do not agree on the other hand about the systematic position to assign to this group: we find it, for instance, paralleled to *Calopteryginae* and *Agrioninae* under a family *Agrionidae* (P. P. Calvert, 'Biologia Centrali Americana'), or paralleled to the various other Selysian "Légions" of *Agrionidae* (de Sélys, R. J. Tillyard, 1913). The question cannot now be settled when we remember the greatly unstable condition of generally accepted views on zygopterous venation (see p. 256, *ante*). Probably Dr. Calvert's view will eventually prevail with the difference of families instead of his subfamilies; but for the moment and for the needs of the present paper the author thinks best to adopt a view which still subordinates the *Lestes* group to the family *Agrionidae*, but

co-ordinates the same to all the rest of the family, instead of the single Sclysian "Légions."

The subordination of the genus *Chlorolestes* to the *Lestinae* means an innovation of considerable taxonomic importance. *Chlorolestes* figures to this day in the Sclysian "Légion Podagrion"—a group not otherwise represented in the fauna under discussion. The distinctive feature of *Lestinae* has been, to the present time, the origin of *M*<sub>3</sub> and *Rs*\* near the alculus, as in most or all of the *Calopterygidae*. With this character as a leading one, *Chlorolestes* would not fall under the *Lestinae*, since the origins in question are (apparently or truly, as it may be) in *Chlorolestes* in the nodal region, much like the immense majority of *Agrionidae*. But Needham has already ascertained that the proximal origin of *Rs* in *Lestes* is not real but apparent, the real *Rs* being marked by an oblique vein, whereas the part proximal to that oblique vein is a "bridge"—a very long one, but otherwise corresponding in position to the bridge of *Anisoptera*. The same oblique vein exists in *Chlorolestes*, as Mr. Herbert Campion, of London, has first suggested in his correspondence to the writer. The same oblique vein also exists in the Australian genus *Synlestes*, the only one which may be reasonably claimed as a very close ally to *Chlorolestes*; and for *Synlestes* Mr. R. J. Tillyard has not only discovered the existence of the important oblique vein, but also ascertained the absolute coincidence of wing tracheation in ontogeny with the facts illustrated for *Lestes* by Prof. Needham, besides other *Lestine* affinities in the *Synlestes* larva. With this evidence in view, we believe there can be little doubt that the true position of *Chlorolestes* is with the *Lestinae*. The form of quadrilateral and *Cu* point in the same direction, as does the general facies of *Chlorolestes*. Thus even now, although our knowledge of tracheation and ontogeny in zygopterous wings is still fragmentary, the removal of *Chlorolestes* from the "Légion Podagrion" to the *Lestinae* may be proposed with a fair possibility of it being on right lines. The guides for the systematic position and definition of *Lestinae* are now the oblique vein and corresponding bridge, of which there is no evidence known to the author in all the rest of the *Agrionidae*.

#### LESTES (Leach, 1815).

The cosmopolitan genus is fairly represented in South Africa, and a large number of species are described from the Ethiopian region.

\* *Rs* is here applied as generally accepted in terminology; regarding the real nature of this vein in Zygoptera, see p. 257 *ante*.

Recent observations by Dr. Wesenberg-Lund give us a good insight into the reasons why species of *Lestes* may be particularly fit to exist under conditions not otherwise favourable for dragonfly life. The European species observed by that author hibernate as eggs (which are concealed and protected in plant tissues, where they are inserted by the female); when hatched at the beginning of the warm season they develop with astonishing rapidity, reaching the imaginal state in a few weeks. Thus they do not strictly need permanent water, and may exist in regions where great drought prevails and suitable water is only available for a comparatively short period of the year. *Lestes* larvae are exceedingly slender, half transparent creatures, jerky and swift in their movements, voracious feeders on Crustacea and small larvae of Ephemerae and Diptera, as may be expected from their rapid growth and development. Our Plate XII, fig. 1, photographed from the European *Lestes virens*, will give an idea of their general appearance.

1. Thoracic dorsum yellowish, olivaceous or reddish brown. No metallic green or black stripes. Superior appendages of male forcipate . . . 2.  
 Thoracic dorsum greenish, olivaceous or reddish brown with dark or metallic green stripes . . . . . 3.  
 Thoracic dorsum black, with three (one medial, two humeral) reddish brown lines; ventral surface of thorax black. Pterostigma rectangular, narrow, reddish brown, yellowish in the distal third. Superior appendages of male forcipate. Small species. (Female unknown.) . . . *Wahlbergi*.
2. Venation mostly ochre yellow. Pterostigma very light yellowish. No dark markings on thorax, not even on ventral surface . . . *ictericus*.  
 Venation dark. Pterostigma reddish brown. On ventral surface of thorax a very distinct black point each side near the ventral and anterior angle of metepimeron. Somewhat variable other dark markings on thorax; four (or six) dark brown points on dorsum, a narrow brown stripe on mesepimeron . . . . . *ochraceus*.
3. Thoracic dorsum greenish or olivaceous with a broad median black or slightly bronzy band, joined laterally to three rectangular spots. Wings hyaline or very slightly tinged with yellow. Pterostigma very dark brown, slightly dilated in the middle. Superior appendages of male very long, whitish with black tips, their distal third strongly curved downward . . . . . *uncifer*.  
 Dark or light markings of thoracic dorsum straight lines . . . . . 4.
4. Thoracic dorsum ferruginous, with two lines of brilliant metallic green in males and immature females, darker, bronzy or coppery in mature females.  
 Wings strongly tinged with yellow; pterostigma dilated in the middle. Superior appendages of male forcipate . . . . . 5.  
 Thoracic dorsum as in (5) in females and immature males, black with a narrow median line and broad humeral bands greenish in adult males.

- Wings hyaline or very slightly tinged with yellow. Pterostigma narrow, rectangular, yellowish brown. Superior appendages of male bent downward in distal third . . . . . *plagiatus*.
5. Yellow colour of wings gradually deeper towards the tips. Pterostigma yellowish in the central, brown in the marginal parts. Superior appendages of males with three distinct medial teeth . . . . . *virgatus*. Yellow colour of wings suddenly deepened to golden yellow in the pterostigmatic region. Pterostigma yellowish throughout. Superior appendages of males with an acute sub-basal median tooth and a trapezoid distal dilatation . . . . . *amicus*.

LESTES ICTERICUS (Gerstäcker, 1869).

This species is not represented in the collections forwarded by Dr. L. Péringuey. It is originally described from an incomplete

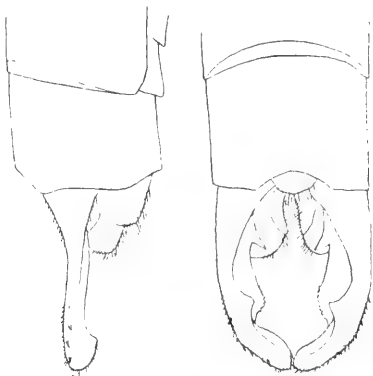


FIG. 8.—*Lestes ictericus*, ♂. Okosongomingo. Appendages, right side and dorsal view.

male from Mombasa. The writer has examined specimens from the White Nile (Vienna and Stockholm Museums), an old female from Dakar in the Sélysian collection (Brussels Museum), a good series from the Kalahari desert (Berlin Museum, alcoholic specimens, described in my paper on Schultze's voyage), and he can now add 2 ♂, 1 ♀, from South-West Africa, "Farm Okosongomingo am Kleinen Waterberg" (H. Thomsen, i-ii. 1913, Hamburg Museum).

♂ (Okosongomingo.) Labium and occiput whitish.

Dorsum of head reddish ochreous; free margin of labrum, ant clypeus and genae lighter, more whitish.

Thoracic dorsum reddish ochreous, a mere trace of a lighter yellowish line at the humeral suture; the same ochreous colour on mesepimeron; metepisternum and metepimeron very light yellow, turning to whitish on the ventral surface. A very small brownish

point in the anterior ventral angle of metepimeron is present in these specimens. Feet whitish yellow with black spines. Abdomen greyish ochreous dorsally, gradually turning to lighter shades on the sides; sternites black. On segments 3-6 a very narrow brownish transverse line near the apical end; a narrow, blackish, mid-dorsal longitudinal line on 9-10. Appendages (Text-fig. 8) very light yellowish, the tips of superior black; inferior appendages short, very slightly divergent, ending in a distinct little knob.

♀. The colours agree almost exactly with the male, only there is on segments 3-6 a distinct trace of a mid-dorsal, longitudinal brownish line.

♂, *Abd.* 33, *hdw.* 20.5, *pt.* 1.5 mm. ♀, 31, 22, 1.5.

#### LESTES OCHRACEUS (Sélys, 1862).

S. Afr. Mus.: 1 ♂, Salisbury, Mashonaland (17. xii. 1911).

The species was originally described from a male specimen labelled "Afrique, probablement du cap de Bonne-Espérance"; the type is in a very mutilated condition, but what remains is sufficient to be identified as very probably the species here described. The writer has examined and described under the name *unicolor*, MacLachl., specimens from Madagascar and the White Nile. Mr. Herbert Champion describes, as *ochraceus*, a series from the islands of Aldabra and Cosmoledo. A ♀ in perfect condition of colours was recently received from Dar-es-Salaam (16. xii. 1913, Dr. A. Dampf).

♂ (Salisbury). Labium light yellowish. Occiput whitish yellow, slightly pruinose. Dorsal surface of head dark brown; base of mandibles and genae whitish. Thoracic dorsum dark reddish brown, this colour extending on part of mesepimeron (the limits not exactly visible in the specimen here described).

Side light yellow with a reddish hue, turning to whitish on the ventral surface. In the ventral and anterior angle of metepimeron a sharply defined, deep black point (no other dark thoracic markings in the present specimen). Feet whitish yellow, spines black; a trace of dark lines on the lateral surface of femora. Some whitish pruinosity at the coxae and the interalar space. Abdomen dark reddish brown dorsally, turning to lighter shades on the sides. Segments 8-9 blackish (discoloured?); segments 3-6 with indication of darker terminal annular marking, sternites black. Superior appendages (Text-fig. 9) reddish brown, darker at the tips; the difference from *ictericus* very slight, even doubtful in some specimens; there is at the level of the ante-apical serrate projection of the medial dilatation a slight ridge on the lateral margin. Inferior appendages longer than

in *ictericus*, their end slender and rather abruptly narrowed (this character seems to be of some importance and pretty regular when compared with the knobbed end of the same organ in *ictericus*).

♀ (Dar-es-Salaam). The dorsal colour of head, thorax and abdomen is decidedly lighter than in the male from Salisbury, and not so reddish, more greyish, with a shade of olivaceous. On thoracic dorsum six brown points in two straight lines of three, almost equidistant from the median and humeral sutures; the foremost of these points very small.

The dorsal colour occupies the anterior half of the metepimeron, where two more dark points exist at the ventral third. Sides otherwise yellowish, turning to greenish white on the ventral surface; the

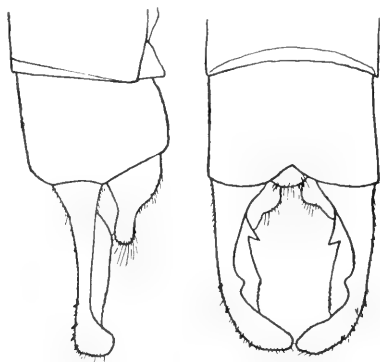


FIG. 9.—*Lestes ochraceus*, ♂. Salisbury. Appendages, right side and dorsal view.

ventral metepimeral points sharp and deep black. Feet light yellowish, distinct dark lines on the external surface of femora and also of first tibiae. Abdomen dorsally like the thorax throughout; very narrow transverse darker lines near the distal ends of segments 2-6; a very narrow mid-dorsal, longitudinal line on 8-10.

♂, *Abd.* 34, *hdw.* 22.5, *pt.* 1.5 mm. ♀, 32, 21, 1.5.

#### LESTES WAHLBERGI, n. sp.

Mus. Stockholm: 1 ♂, Caffraria (Wahlberg).

This single example very probably represents a distinct and otherwise undescribed species. It is not to be expected that individual colour varieties or stages of maturity in *ochraceus* or *ictericus* should culminate in the black-and-reddish colour scheme of this example.

The superior appendages are not characteristic; the inferior are nearer to *ictericus*, which species is more widely different in colours.

♂ (adult, colours in good condition). Labium and occiput whitish. Labrum light yellowish brown with a greenish shade. Dorsum of head otherwise dull brownish black and light reddish brown. Reddish brown also are the base of the mandibles and genae, the anteclypeus, and a narrow transverse line slightly concave anteriorly across the base of the antennae and the anterior ocellus. Prothorax dull black. Thoracic dorsum dull black with three about equally broad light reddish-brown lines on the median and at the humeral sutures, the latter ones not reaching quite to dorsal or ventral end of suture. Sides dull black; a rather broad metepisternal reddish band from the metastigma dorsal not quite to the dorsal end; latero-ventral margin of metepimeron very narrowly lined with reddish brown. Ventral side

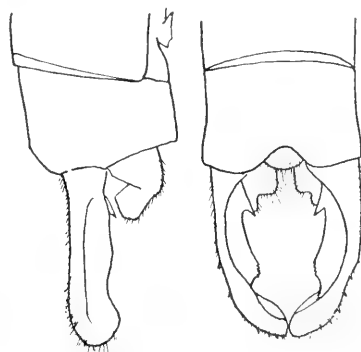


FIG. 10.—*Lestes Wahlbergi*, ♂. Cafraria. Appendages, right side and dorsal view.

black; a double triangular yellowish spot on the unpaired sclerite of metasternum. Some pruinose blue points in the interalar space. Legs very light yellowish brown; narrow blackish lines on the external side of femora and internal side of tibiae; spines black. Abdomen dark reddish brown dorsally, turning to very light yellowish brown ventrally, marked with dark brown; dorsum of segments 1 and 2, 3-6 narrow terminal rings and almost circular, anteriorly diffuse ante-terminal spots; 7 black with a lateral longitudinal reddish stripe on two-thirds of length; 8-10 wholly black. Appendages black and yellow; the dorsal ridge, sub-basal tooth and tips of superior, basal portion of inferior black. Inferior appendages very short, ending in a blunt, slightly upturned knob (Text-fig. 10). Wings hyaline; venation blackish; pterostigma rectangular, narrow, proximal two-thirds dark reddish brown, distal third turning gradually to light yellowish brown.

Abd. 31, hdw. 18, pt. 1 mm.

## LESTES VIRGATUS (Burmeister, 1839).

S. Afr. Mus.: 1 ♂, 1 ♀, King William's Town District, St. Mathews (iv. 1894, R. M. Lightfoot); 1 ♀, Dunbrody (3. vi. 1912); 1 ♂, Matopa Dam, Bulawayo (16. ii. 1911); 1 ♀, Zambesi River, near Sunyati River (v. 1912). Collections of Brit. Museum, Stockholm and E. B. Williamson: 8 ♂, 6 ♀, Salisbury, Mashonaland (iii, iv. 1900, iv. 1904, iii, iv, v. 1905, G. A. K. Marshall). Brit. Museum: 1 ♂, 2 ♀, Chirinda Forest, Gazaland, 3600–4000 ft. (3, 7, 19. x. 1905, *id.*); 1 ♀, Mangesi River, S.E. Mashonaland (25. x. 1905, *id.*). Coll. K. J. Morton: 1 ♀, Durban, Natal (16. xii. 1907, Miss M. Fountaine). Coll. E. B. Williamson: 1 ♂, Natal, 1 ♀, Princetown, Natal

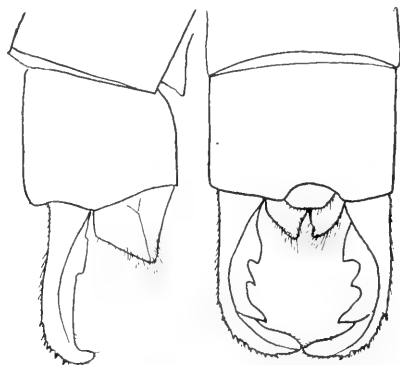


FIG. 11.—*Lestes virgatus*, ♂. Chirinda Forest. Appendages, right side and dorsal view.

(7. ii. 1910, G. F. Leigh). Mus. Tervueren: 3 ♂, 2 ♀, Kapiri, Katanga (ix. x. 1912, Legros).

♂. Labium and occiput whitish yellow. Labrum and anteclypeus olivaceous. Genae and base of mandibles yellowish. Postclypeus and anterior margin of frons ferruginous. Dorsal surface of head otherwise blackish brown with metallic green reflections; towards the eyes and the posterior border dull reddish brown, this colour projecting anteriorly in two variable and irregular spots between the lateral ocelli and the eyes. Prothorax dull reddish brown with the merest trace of metallic sheen. Thoracic dorsum ferruginous; two parallel bands of brilliant metallic green occupy almost exactly the median third of each mesepisternum. Sides ferruginous on the mesepimeron and anterior half of mesinfraepisternum, turning abruptly to sulphur yellow on metepisternum and metepimeron; a metallic green stripe on the upper three-fourths of mesepimeron, an incomplete brownish



stripe on the second lateral suture. Ventral side whitish yellow; metasterna bordered laterally by a narrow but very distinct blackish line, which begins at the posterior third (where there is a break in the outline of the sclerite) and continues anteriorly to the median ventral suture, projecting as a very narrow branch on the metepimeron near its anterior end. Legs yellowish brown; lateral side of femora, ventral side of tibiae, tarsi and spines black.

Dorsum of abdomen metallic green, passing gradually into dull blackish brown on the terminal segments; a very narrow median line ferruginous on segments 2-5.

Sides yellowish or reddish brown on segments 1-7, the blackish colour of dorsum projecting in rather broad terminal rings on 3-7. Appendages dark brown (Text-fig. 11). Wings (see p. 270).

♀. Very similar in colour and markings to male. In some very mature specimens the metallic colour of the thoracic bands and dorsum of abdomen turns to coppery or dark bronzy green.

♂, *Abd.* 39 + 1, *hdw.* 27, *pt.* 2 mm. ♀, 38, 29, 2.

#### LESTES AMICUS (R. Martin, 1910).

British Museum: 2 ♀, N.E. Rhodesia, Upper Luangwa River (27. vii. 1913, viii. 1910, S. A. Neave). Mus. Tervueren: 1 ♂, 3 ♀, Kapiri, Katanga (ix, x. 1912, Legros); 1 ♀, Kihsenda (12. vi. 1912, Dr. Bequaert).

♂. Labium whitish. Occiput yellowish, a black spot on each side on the anterior half. Labrum and anteclypeus dull reddish brown; postclypeus blackish with two dull reddish-brown transverse lines. Genae and base of mandibles light yellow. Dorsal surface of head black along the eyes and over the ocelli, ferruginous at the occipital border and anterior to the ocelli. Prothorax ferruginous, with two small dorsal metallic green spots. Thoracic dorsum ferruginous; two brilliant metallic green parallel stripes, each nearly as broad as the ferruginous band on the median suture. Sides ferruginous on the mesepimeron, where another metallic green stripe occupies the dorsal two-thirds of the sclerite; otherwise whitish yellow, a metepisternal ferruginous stripe, broader dorsally, narrow ventrally, running from the dorsal end of the second lateral suture across the metastigma to the third coxa. Ventral side whitish; blackish lines on the metasterna much as in *L. virgatus*. Legs reddish brown; lateral side of femora, ventral side of tibiae, tarsi and spines black.

Abdomen dorsally metallic green, less brilliant than the thoracic stripes and gradually darkening on the terminal segments; sides and

narrow basal rings on segments 2-7 light yellowish brown; a narrow mid-dorsal line on segments 2-8 ferruginous. Appendages dark brown (Text-fig. 12). Wings (see page 270).

♀. Very similar to ♂ in colour and markings. Sides of segments 8-10 and valves ferruginous.

♂, *Abd.* 35 + 1, *hdw.* 25, *pt.* 2 mm. ♀, 35, 27, 2.5.

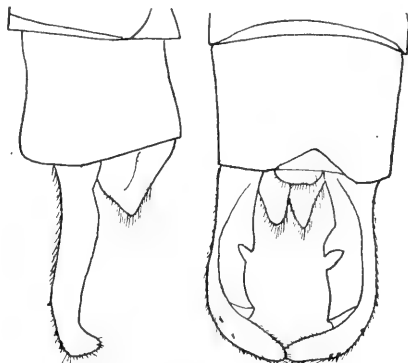


FIG. 12.—*Lestes amicis*, ♂. Kapiri. Appendages, right side and dorsal view.

#### LESTES PLAGIATUS (Burmeister, 1839).

S. Afr. Mus.: 1 ♂, 1 ♀, Waterval, Transvaal (9 . xi . 1899; 16 . xi . 1902); Acornhoek, Transvaal (xii . 1918, Tucker); 1 ♂, East London (1885, J. Borchard); 2 ♀, Duubrody (4 . iii . 1912); 1 ♀, Rietfontein (30 . x . 1904); 1 ♀, M'Fongosi, Zululand; 1 ♀, Matopo Dam, Bulawayo (16 . ii . 1911); 1 ♂, Zambesi River, near Sanyati River (v . 1912). Brit. Mus. and Coll. E. B. Williamson: 5 ♂, 2 ♀, Salisbury, Mashonaland (iv . 1899; ii . 1900; iv . 1905, G. A. K. Marshall). Brit. Mus.: 1 ♀, Mazoe 4000 ft., Mashonaland (25 . xii . 1905, *id.*). Coll. K. J. Morton: 1 ♂, Natal. Coll. E. B. Williamson: 1 ♀, Princetown, Natal (9 . xii . 1908, G. F. Leigh). Mus. Tervueren: 1 ♂, Sankina (30 . vii . 1911, Dr. Bequaert). Coll. Ris: 3 ♂, 2 ♀, Botchabelo, Transvaal, 1200 m. (17, 23 . ii . 1914, H. Junod).

♂ (adult). Labium and occiput whitish yellow. Labrum anteclypeus, genae and base of mandibles olivaceous. Dorsal surface of head dull black. Prothorax dorsally black. Thoracic dorsum black; a very narrow line on the median suture and a rather broad band at the humeral suture olivaceous, the latter occupying nearly the lateral third of the mesepisternum and stopping slightly short of the ventral

end of the suture. Sides black at the humeral and second lateral sutures, yellowish on anterior half of mesepisternum and posterior half of metepimeron, the black bands being considerably broader than the yellowish ones. Ventral side yellowish; narrow black lines along the anterior half of the lateral margins of metasterna, not reaching to the median ventral suture. Legs yellowish, largely lined with black as in the two preceding species.

Abdomen dorsally black, a dark metallic lustre gradually vanishing towards the end; the merest trace of a mid-dorsal yellowish line on the basal segment. Sides yellowish, this colour ascending to form very narrow, incomplete basal rings; ante-apical dilatation of dorsal black colour very slight. Appendages black (Text-fig. 13).

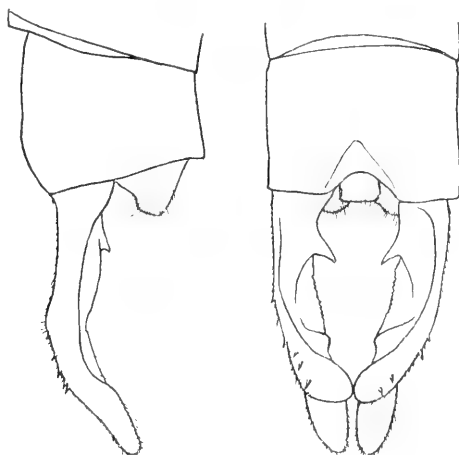


FIG. 13.—*Lestes plagiatus*, ♂. Waterval. Appendages, right side and dorsal view.

The thoracic pattern is liable to be still more obscured in some very mature specimens (as shown by specimens from Zambesi and Salisbury). The thorax becomes black, the ventral side included, only a very narrow line on the median suture, narrow juxtahumeral and metepisternal bands remaining yellowish or olivaceous. Immature males are almost exactly like the females in colour and pattern.

♀. Labrum ferruginous. Dorsal surface of head dark brown. Prothorax and thoracic dorsum ferruginous, more ochre yellow in very mature specimens. Two narrow mesepisternal stripes, bright metallic green in younger, blackish in more mature specimens; the stripes narrower than in *L. virgatus*, and considerably nearer to the median than to the humeral suture.

Sides ferruginous or ochre yellow, ventral side whitish; a narrow and much abbreviated mesepimeral stripe metallic green or blackish, and a very narrow black line on the lateral margin of metasterna, not reaching to the median ventral suture anteriorly and little exceeding the middle of the border posteriorly. Abdomen much as in male, the metallic colour green in younger, coppery or dark bronze in very mature specimens.

Immature males and females are very similar in colour and markings; mature individuals show a sexual dimorphism of colour that might make the association of sexes difficult if we had not the various stages of the male pattern and the characteristic form of appendages as guides.

♂, *Abd.* 34 + 2, *hdw.* 25.5, *pt.* 1.5 mm. ♀, 31, 24.5, 1.5 (unusually small) to 36, 38, 1.5 mm.

#### LESTES UNCIFER (Karsch, 1899).

Coll. Ris: 1 ♂, Lorenço Marques (6. xii. 1911). Mus. Tervueren: 1 ♂, 1 ♀, *in cop.*, Kasenga (1. ii. 1912, Dr. Bequaert).

♂. Labium whitish; occiput very light greenish. Labrum, anteclypeus, postclypeus, genae and base of mandibles whitish green. Dorsal surface of head dull black. Prothorax olivaceous, dorsally widely black.

Thoracic dorsum olivaceous, a broad median band black, this band covering slightly more than the median third of each mesepisternum and projecting laterally as two spots, the larger one rectangular at the dorsal end, the smaller one nearly square at the ventral third (in the less mature specimen from Lorenço Marques only these two spots on each side are black, the median band being but slightly darker in colour than the rest of the mesepisterna). Sides very light greyish passing to olivaceous posteriorly and ventrally, marked with black; three dots at the humeral suture; a narrow stripe near the posterior border of the mesepimeron, over about the median third; a line on the dorsal third of the first lateral suture, bent forward at its upper end; a line on the dorsal third of the second lateral suture; two dots on the latero-ventral border of metepimeron. Ventral side whitish, marked with black; a large triangular spot pointed forward on each metasternum; a narrow line on the median suture; dots on the coxae. Legs light yellowish, three lines on femora, the inner side of tibiae black.

Abdomen very slender, light greenish to olivaceous, gradually darker towards the end; dorsum blackish. Segment 1 green almost entirely;

2-6 with narrow dorsally incomplete greenish basal rings, the black dorsal band comparatively narrow, widened towards the end; 7 almost wholly blackish; 8 largely olivaceous at the sides; 9-10 wholly dark.

Appendages (see p. 269 and Text-fig. 14).

♀. Very similar to male. Labrum bluish grey; dorsal surface of head not so deep black. On thoracic dorsum the black band reduced to a narrow line on each side with corresponding lateral projections, the central part reddish brown. Ventral black spots smaller. Abdomen

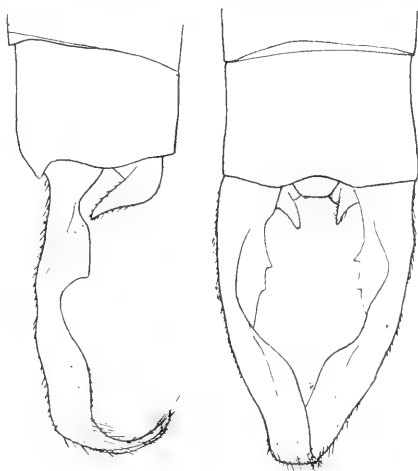


FIG. 14.—*Lestes uncifer*, ♂. Lorenzo Marques. Appendages, right side and dorsal view.

on segments 7, 8 and 10 rather light in colour, a round light spot on each side of 9. Appendages small, shorter than segment 10, whitish.

♂, *Abd.* 39 + 2, *hdw.* 25, *pt.* > 1 mm. ♀, 34, 24, > 1.

### CHLOROLESTES\* (Sélys, 1862).

This genus is, as far as our present knowledge goes, limited to the faunal region discussed in the present paper. For a description of the larva of *Chlorolestes conspicua* see p. 445.

1. Origin of *A*\* at the level of the proximal side of 9. *Cuq* at the level of first *Anq* or slightly proximal thereto. Inferior appendages of male not bifid at tips . . . . . 2.

\* Dr. Ris intended to add to his MSS. the description of the larva and oviposition of *Chlorolestes* from specimens supplied to him, but as this was not received in time for incorporation Mr. Barnard's notes and figures are given at the end of this paper. [EDITOR.]

- Origin of *A\** distal to the level of proximal side of 9. One row of cells in field *Rs*—*M3*. Pterostigma less than three times as long as broad. Medial edge of superior appendages of male smooth. Occiput blackish. Inferior appendages of male bifid at tips . . . . . 3.
2. Pterostigma long, nearly four times as long as broad. Two rows of cells in distal half of field *Rs*—*M3*. Medial edge of superior appendages in male smooth. Occiput yellow. Largest species of genus . . . *conspicua*. Pterostigma less than three times as long as broad. One row of cells in field *Rs*—*M3* throughout. On medial edge of superior appendages in male a sub-basal tooth and a sub-apical lobe. Occiput metallic green. Smaller species . . . . . *Peringueyi*.
3. *Cuq* distal to the level of first *Anq*. Pterostigma mostly two-coloured, black at the proximal, yellow or reddish brown at the distal end (almost wholly black in some very mature specimens) . . . . . 4. *Cuq* at the level of first *Anq* or slightly proximal. Pterostigma uniformly coloured, light yellowish or reddish brown. Smallest species of genus *umbrata*.
4. Abdomen very long, its metallic colour dull. On the humeral suture a broad yellowish or olivaceous band. On the second lateral suture at most some indistinct traces of darker colour. Metasterna with dark markings . . . . . 5. Abdomen much shorter, its metallic colour brilliant green. Anterior to the humeral suture a narrow yellowish band not entirely to the dorsal end. A sharply defined blackish band at the second lateral suture. Metasterna with a very narrow dark line on the median suture only. *fasciata*.
5. Wings of adult male whitish pruinose from 9 to about the proximal third of the distance between nodus and pterostigma, dark brown on the second third of this distance or slightly more on front wing, for two to three cells more in hind wing . . . . . *tessellata*. Wings of all specimens hyaline, at most a very narrow brownish border of the tips. Otherwise very similar to preceding species . . . *longicauda*.

#### CHLOROLESTES CONSPICUA (Sélys, 1862).

S. Afr. Mus. : 1 ♂ (old, no locality or date); 1 ♀, Cape, but no exact locality; 1 ♀, Cape Town, Table Mountain (ii. 1894, R. M. Lightfoot).

♂ (apparently almost mature, but very old and perhaps discoloured). Labium whitish yellow, occiput ochreous, blackish in the upper fourth. Labrum shining black. Anteclypeus dull yellow; genae and base of mandibles bright yellow. Dorsal surface of head deep reddish brown, blackish in the ocellar region, brilliant metallic green in a narrow band on each side along the eye. Prothorax dark reddish brown, with a round orange spot on each side. Thoracic dorsum very deep brown, almost black, a narrow orange band near the humeral suture, distant from the suture slightly less than its own

breadth, from the inferior margin to about three-fourths height of the mesepisternum. Sides of the same deep brown colour on mesepimeron; a sharply defined bright yellow band on metepisternum, not quite to the second lateral suture; a brown band of about the same breadth on this suture and the antero-dorsal half of metepimeron; postero-ventral half of metepimeron and metasterna whitish. Legs moderately long, blackish; femora reddish brown at base and inferiorly.

Abdomen slender; deep reddish brown, gradually passing to blackish on the ends of each segment; sides narrowly bright yellow; this colour ascending in narrow, dorsally incomplete basal rings on segments

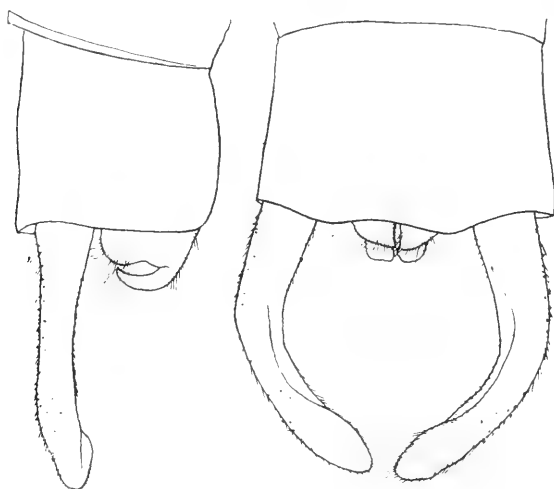


FIG. 15.—*Chlorolestes conspicua*, ♂. Cape. Appendages, right side and dorsal view.

3 to 7 and interrupted by broad ante-apical black rings on the same segments; 8 blackish with broad lateral ferruginous bands; 9 wholly blackish; 10 blackish dorsally, ferruginous ventrally. Appendages black (Text-fig. 15); the end of inferiors upturned in the shape of a simple, very acute claw.

Wings hyaline. Pterostigma rich reddish brown. Neuration (Plate VII, fig. 1).

♀. Of stouter build, but almost exactly similar to male in colour and pattern. Dark dorsum of abdomen with some bronzy metallic lustre (the specimen is more mature than the above-described male); ninth segment dark ferruginous. Neuration (Plate VII, fig. 2).

♂, *Abd.* 51 + 2, *hdw.* 33, *pt.* > 3 mm. ♀ 45, 35, 3.

## CHLOROLESTES PERINGUEYI, n. sp.

S. Afr. Mus. : 2 ♂, Ceres, Cape Colony (iv. 1913, R. M. Lightfoot).

♂ (adult). Labium very light yellowish brown. Occiput black, turning to metallic green ventrally, to brown medially. Labium metallic green. Anteclypeus, genae, base of mandibles light yellowish brown.

Dorsal side of head metallic green. Antennae black, the basal joint yellow. Prothorax greenish, coppery, narrowly bordered with reddish brown, two reddish-brown spots near the anterior angles. Thoracic dorsum black with dark green and coppery lustre; a very narrow reddish-brown line on the median suture and three such spots at the

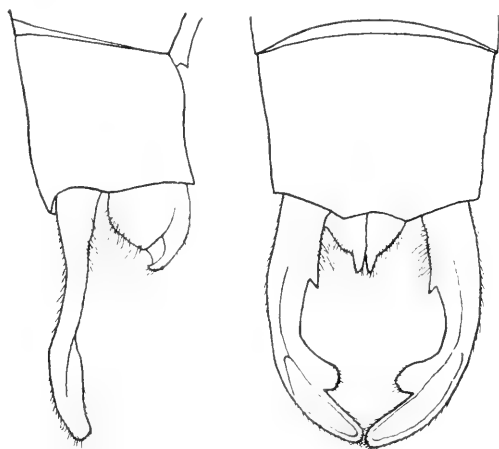


FIG. 16.—*Chlorolestes peringueyi*, ♂. Ceres. Appendages, right side and dorsal view.

humeral suture; a very small one at the dorsal end, a somewhat larger and square one just above the middle and an oblong one at the ventral third. Mesepimeron bronzy black, an oblong reddish-brown spot at the dorsal fourth of first lateral suture; metepisternum reddish brown, this colour passing narrowly to mesepimeron at the ventral end; dorsally to metastigma a rhomboid black spot narrowly confluent with the mesepimeral black colour; metepimeron reddish brown, a cuneiform metallic stripe on the dorsal end of second lateral suture, passing into a narrow black line on the inferior half of the suture. Ventral side reddish brown, slightly whitish pruinose, part of the sutures narrowly lined with black. Legs reddish brown, black lines at the lateral side of femora and ventral side of tibiae; tarsi and spines black.



Abdominal segment 1 reddish brown, dorsally black, whitish pruinose; 2 bronzy green, a narrow basal ring and the lateral border to the middle, where this colour ascends dorsally, reddish brown; 3 to 6 light reddish brown, marked with dark bronzy green; a broad terminal ring, somewhat less than the apical fourth; a dorsal band, broad at the beginning at about one-fifth of the segment's length from the anterior margin, gradually narrowing to a somewhat diffuse confluence with the terminal ring; 7 black, a narrow basal brownish ring, dorsally interrupted; 8-10 black, 9-10 with thin whitish pruinosity. Appendages black (Text-fig. 16).

Neuration (Plate VII, fig. 3). Pterostigma dark brown, the distal end very narrowly lighter.

*Abd.* 38 + 1.5, *hdw.* 27, *pt.* < 2 mm.

CHLOROLESTES UMBRATA (Sélys, 1862).

Mus. Brussels (formerly de Sélys' Collection); 1 ♂, being a type of the original description, as testified by the following labels: (*Chlorolestes umbratum*, H. ♂ [in Sélys' hand]/Schneider Charpentier. (*id.*) / *L. umbrata* . . . Cap. b. sp. [in Hagen's hand] Prom. b. sp. / Mus. Berol.) Brit. Museum: 1 ♂, bearing an old round label C[ape of] G[ood] H[ope] 42 70.

Both specimens belong to the same species, which is not otherwise represented in our series and is evidently a very distinct species. In the Sélysian specimen the abdominal segments 7-10 are lost (replaced by the corresponding segments of *Allocnemis leucosticta*); in the British Museum specimen the colours are not in good condition and the left pair of wings is lost.

♂. Labium dull brown. Occiput black. Labrum, anteclypeus, genae, base of mandibles and frons to the base of antennae dull reddish brown (discoloured and probably lighter in well-preserved specimens); dorsal side of head otherwise black, with an appearance of rather large reddish brown (as above) postocular spots. Prothorax metallic green, sides narrowly yellowish. Thoracic dorsum brilliant metallic green, this colour occupying also part of the sides, the mesepimeron entirely; a large cuneiform stripe on the metepisternum, the entire breadth of the sclerite at the dorsal end, a point just above the metastigma; on the metepimeron a small spot near dorsal end of second lateral suture, narrowly joined to metepisternal black stripe. Light yellowish brown or orange: a very narrow line on humeral suture stopping a little short of the dorsal end; a small round spot in the antero-dorsal angle of mesepimeron; ventral half of metepi-

sternum, ascending in a very narrow line almost to the dorsal end of the first lateral suture; most of metepimeron; ventral side. The suture of metepimeron and metasternum edged with two narrow black stripes; the anterior one metasternal, the posterior one metepimeral; a short median black stripe near the posterior end. Legs reddish brown; external side of femora and ventral side of tibiae with black lines; tarsi and spines black.

Abdomen brilliant metallic green on dorsum, gradually darker to the end. Segment 1 the sides yellowish with an oblique black line; 2 sides broadly yellowish; 3-6 a very narrow yellowish line at lateral margin, stopping at about three-fourths of the length, and very narrow, incomplete basal rings; dorsum of 8-10 with thin whitish pruinosity (specimen in Brit. Mus.).

Appendages of the same type as in the three following species.

Wings whitish pruinose from 9 to fifth post-nodal vein in front wing, to fourth in hind wing; smoky brown more distally, to the pterostigma in hind wing, two cells less in front wing (Sélys) or distal end of pterostigma in hind wing, proximal end in front wing (Brit. Mus.). Pterostigma bright orange yellow, narrow (Sélys), or light reddish brown and a little broader (Brit. Mus.).

*Abd. hdw.* 20, *pt.* 2 mm. (Sélys); 37 + 1, 22, > 1.5 (Brit. Mus.).

#### CHLOROLESTES FASCIATA (Burmister, 1839).

S. Afr. Mus.: 1 ♂, Cape, Albert District (8. iv. 1884); 1 ♂, 1 ♀, Burghersdorp (1833, Dr. Kannemeyer). Brit. Mus.: 1 ♂, 1 ♀, Burghersdorp (1883, Dr. Kannemeyer); 6 ♂, 4 ♀, Estcourt, Natal, Will Brook (20. i, 9. ii. 1913, R. C. Wroughton); 3 ♂, Natal, 1 ♀, Zululand (1897, Rev. W. H. Heale). Coll. K. J. Morton: 2 ♀, Dargle, Natal (13. ii. 1909, Miss Fountaine). Coll. Ris: 1 ♂, 1 ♀, Estcourt, Natal, Will Brook (30. iii, 27. iv. 1913, R. C. Wroughton, *ex* Brit. Mus.).

♂ (adult). Labium yellowish. Occiput brilliant metallic green. Labrum metallic green; anteclypeus, base of mandibles and medial half of genae yellow; postclypeus yellow with a basal metallic green spot of variable size. Dorsal side of head otherwise brilliant metallic green; basal joint of antennae yellow, the rest black. Prothorax metallic green; a broad yellow longitudinal band half way from the coxa to the mid-dorsal line. Thoracic dorsum metallic green, mostly very brilliant; a narrow yellow line at the humeral suture, stopping at four-fifths of the height. Mesepimeron metallic green; metepisternum yellow with a metallic green line of variable dimensions;

metepimeron largely black, this colour occupying the space from the second lateral suture to a rather narrow band at the latero-ventral border where there is another small, longitudinal black dash; this metepimeral band has a metallic green lustre and is often covered with bluish pruinosity. Ventral side yellow; a small median metallic green line at the posterior end. Legs yellowish; lateral side of femora black with metallic green lustre; ventral side of tibiae, tarsi and spines black.

Abdomen bright metallic green, turning gradually to coppery or bronze towards the end. Sides of segments 1-2 broadly yellow; a very narrow lateral line and basal ring on 3-7; 1 and 8-10 dull greyish pruinose.

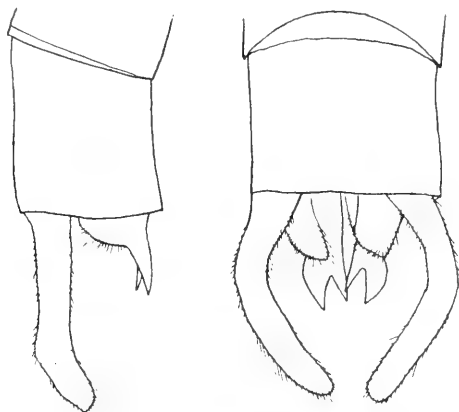


FIG. 17.—*Chlorolestes fuscata*, ♂. Burghersdorp. Appendages, right side and dorsal view.

Appendages black (Text-fig. 17).

Wings comparatively broader on their distal half than in the two following and also the preceding species, more densely veined (Plate VII, fig. 4); opalescent white (waxy exudation) from 9 or the nodus to about one-third the distance from nodus to pterostigma in front wing, nearly one-half in hind wing; the white band followed by another of smoky brown, shorter in front wing, longer in hind wing, as shown in the figure. Pterostigma rich ferruginous brown, the proximal end blackish to a variable extent between a mere trace and almost half the length.

The metallic colour of the immature males is more brilliant; the white and brown wing bands are absent; but there are some specimens with hyaline wings, where texture and colour of integuments are not

far from maturity; some doubt exists about the existence of a male form that remains hyaline throughout the imaginal life. Of the series here described, 6 males are banded, 7 hyaline.

♀. Very similar to male in colour and pattern. On the prothorax an anterior transverse yellow band; the humeral and lateral yellow bands very slightly broader than in male. Abdomen shorter and much stouter; a broad yellow lateral band from base to segment 8, a narrow one on 9. Wings hyaline in all specimens examined.

♂, *Abd.* 32 + 1·5, *hdw.* 25, *pt.* 2 mm. to 38, 28, 2·5. ♀, 32, 26, 2.

#### CHLOROLESTES TESSELLATA (Burmeister, 1839).

S. Afr. Mus.: 2 ♂, old specimens, no locality or date. Brit. Mus.: 1 ♂, Grahamstown (1885); 1 ♂, Pirie Bush, S. Africa (1898, A. N. Stenning).

♂ (adult). Labium yellowish brown. Occiput bronze black. Labrum metallic green; anteclypeus, base of mandibles and medial half of genae yellow; postclypeus dull reddish brown. Dorsal side of head dull black with a greenish metallic lustre between the eyes and ocelli. Prothorax black, two broad lateral bands and the anterior third entirely dull ochre brown. Thoracic dorsum bronze black; a broad entire oblique greyish ochreous humeral band, in front of the ventral end of humeral suture, divided in two about equal halves by the dorsal end of the same. Mesepimeron bronze black not fully to the ventral end; rest of sides ochreous yellow with an indistinct brownish shade on dorsal end of mesepisternum and metepimeron. Ventral side ochreous yellow; a rather broad lateral brown stripe at the anterior half of metasterna. Legs ochreous; antero-external side of femora, ventral side of tibiae, tarsi and spines black.

Abdomen dorsally dull reddish brown with metallic green lustre, this metallic colour shading to darker bronze towards the end; a broad but somewhat diffuse terminal blackish ring on segments 3-7. Appendages black, very much like the following species.

Wings with opalescent white and smoky brown bands, as described in key, and illustrated in Plate VII, fig. 5. Pterostigma broad and comparatively short; the proximal part blackish, the distal rich ferruginous; the proportion of both colours somewhat variable.

One immature specimen (S. Afr. Mus.) shows the opalescent band alone, with no trace of smoky brown; it is very probably of the same species; the terminal abdominal segments are lost.

♂ *Abd.* 44 + 1·5, *hdw.* 31, *pt.* 2 mm.

No females have been examined by the writer.

## CHLOROLESTES LONGICAUDA (Burmeister, 1839).

S. Afr. Mus.: 12 ♂, 10 ♀, Barberton, Transvaal (Edwards, dated 1 ♂ v. 1911, 1 ♀ xi); 4 ♂, 2 ♀, M'Fongosi, Zululand (W. E. Jones, dated 20 . ii, iv . 1911). Coll. K. J. Morton: 1 ♂, Natal; 1 ♂, 1 ♀, Eshowe, Zululand (16, 17 . iii . 1908, Miss Fountaine).

♂. Colour and pattern of head and thorax almost exactly similar to preceding species. Postclypeus bronze black to metallic green. On metepimeron an interrupted and somewhat diffuse brown band near the second lateral suture; this band covered in fully mature specimens by a whitish pruinosity, which also invades the metasterna. Abdomen dorsally black (none of the specimens of *tessellata*

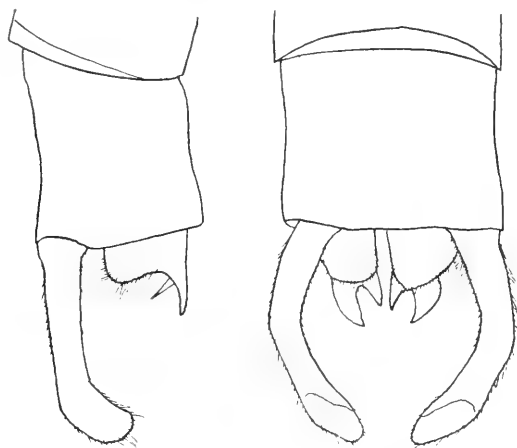


FIG. 18.—*Chlorolestes longicauda*, ♂. Barberton. Appendages, right side and dorsal view.

examined are fully mature, the difference in colour of abdomen being probably due to age), with a metallic green lustre, rather brilliant on segments 1-2, gradually passing to dull bronze and black to the end; sides of 1-2 broadly yellow, of 3-8 with a very narrow lateral yellow line, interrupted by a broad terminal black ring and narrow basal yellow ring. Dull greyish pruinosity on segments 1 and 8-10, brilliant white on 9 in some specimens. Appendages black (Text-fig. 18).

Wings hyaline, narrowly and faintly brown at the tips. Pterostigma bi-coloured in younger specimens: black in proximal half, whitish yellow in very immature examples, rich ferruginous in the distal half in more mature specimens. In fully mature individuals the

ferruginous colour passes gradually to black, the final result being a unicolorous blackish pterostigma.

♀. Very similar to male in colour and pattern. Abdomen comparatively shorter and much stouter; lateral yellowish band broad on segments 3-7, although interrupted by the terminal blackish-brown rings; 8-10 dull reddish brown with thin greyish pruinosity. The two colours of pterostigma more sharply defined than in male.

♂, *Abd.* 44 + 1.5, *hdw.* 29, *pt.* 2 mm. ♀, 45, 33, 2.5.

This and the preceding species are so exactly alike in proportions, structural characters, venation and colour pattern that the possibility remains open of their being forms of but one species. The present material excludes the eventuality of *longicauda* being the immature, *tesselata* the mature colour of male (as shown for *fasciata*, ante), but the two might well be geographical races or subspecies.

## IBB. SUBFAMILY AGRIONINAE.

Of the Sélysian "Légions," three are represented in the present fauna (after removal of *Chlorolestes* from the "Légion Podagrion" to the *Lestinae*, as discussed on p. 268). The "Légion Platycnemis" includes, in de Sély's own papers, the genera *Allocnemis*, *Chlorocnemis* and *Metacnemis*. *Disparoneura* is representative of the "Légion Proto-neura." The remaining genera *Pseudagrion*, *Ceriagrion*, *Enallagma*, *Ischnura* and *Agricnemis* are the South African representatives of the "Légion Agrion," one of the largest and most homogeneous units of the entire Order Odonata. We must admit that at various points the limits of the "Légions" as given by de Sélys are doubtful. The present paper is not one where the questions here arising might be profitably discussed; nevertheless, small as the number of genera represented in our faunal limits may be, there are two points where accepted views appear in an unfavourable light: When we confront the venation of *Allocnemis*, *Chlorocnemis* and *Disparoneura* (Plate VII, figs. 7, 8, 9) on one side, *Metacnemis* (Plate VII, fig. 10) on the other side, there can be no doubt about the great analogy between the three of the former group in the region of the quadrilateral and the conditions of *Cu* 2 show a natural line of reduction from *Allocnemis* through *Chlorocnemis* to *Disparoneura*. Further, the three have in common the peculiar shape of head, much restricted in the frontal region with the eyes very strongly prominent; the terminal appendages of males are built on the same plan; finally, the colour scheme and its ontogenetic development in *Disparoneura* is about the

same as in many members of the "Légion Platycnemis." On the other hand, in *Metacnemis* the configuration of the quadrilateral, with its distal side slightly more oblique and sensibly strengthened, together with origin of *Cu* 2, the origin of *A*\* unusually proximal to *Cuq*, are features extraneous to the other group of three genera; the head of *Metacnemis* is much more of the Agrion- than of the Platycnemis-type, being broad in the frontal part, with the eyes not excessively prominent; the femoral and tibial spines are very long in *Metacnemis*. Thus for the purpose of this paper we have adopted the subdivisions as given by de Selys; we give the genera *Allocnemis*, *Chlorocnemis* and *Disparoneura* in an apparently natural order, and place *Metacnemis* in the immediate line with the true "Agrion."

Of our genera, *Ischnura* and *Enallagma* alone are known in the larval stage from Europe and America. Plate XII, fig. 2, photographed from living full-grown larvae of the European *Platycnemis pennipes*, may give a general idea of Agrionine larvae of the opaque type. This opaque type exists, to a large extent independently of systematic position, whenever a nymph lives on the bottom of water, partly covered by mud, detritus or algae; *Platycnemis pennipes* is the truest representative form of this type in the European fauna. At the opposite pole, as the truest representative of the transparent larval type, we have *Enallagma cyathigerum*—larvae not living at the bottom of the water, in the living green plants and wonderfully adapted to this surrounding by colour, pattern and transparency.

### ALLOCNEMIS (Selys, 1863).

The South African species is not recorded from beyond our faunal limits, and but one other species of this genus (unknown to the writer) is described from tropical West Africa.

#### ALLOCNEMIS LEUCOSTICTA (Selys, 1863).

S. Afr. Mus.: 2 ♂, 1 ♀, Waterval (3, 26 . ii . 1899); 1 ♂, Groenvleikloof (6 . i . 1907); 8 ♂, 6 ♀, Barberton, Transvaal; 6 ♂, 2 ♀, 2 ♂ ♀ *in cop.*, M'Fongosi, Zululand (iii, iv, v, xi . 1911, W. E. Jones). Brit. Mus.: 1 ♂, 1 ♀, Estcourt, Natal, Will Brook (i, ii . 1913, R. C. Wroughton). Coll. K. J. Morton: 1 ♂, Stutterheim, Cape Colony (9 . i . 1908, Miss Fountaine); 2 ♂, Barberton, Transvaal (18, 20 . xi . 1908, *id.*). Coll. E. B. Williamson: 6 ♂, 1 ♀, Princetown, Natal (23–27 . ii . 1909, G. F. Leigh).

♂(adult). Labium whitish, the points of lateral lobes black. Occiput

black. Labrum light greenish, turning to yellowish anteriorly; in some specimens a small black spot at the base. Frontal view of head remarkable for three transverse, straight, nearly equal stripes that run right across the compound eyes, two greenish, the median, slightly narrower one black. Labrum, base of mandibles and genae, anteclypeus, postclypeus and the sides of frons in equal breadth, black; the frons not quite up to the base of antenna is green. Dorsal surface of head and antennae otherwise wholly black. Prothorax black dorsally; a transverse whitish median anterior mark; sides greenish, narrow anteriorly, broader to the posterior end, also to the coxae. Posterior lobe broad, regularly curved, raised to an angle of  $45^{\circ}$ . Thoracic dorsum black; narrow, straight, completely greenish are the ante-humeral lines, distant from the humeral suture by not

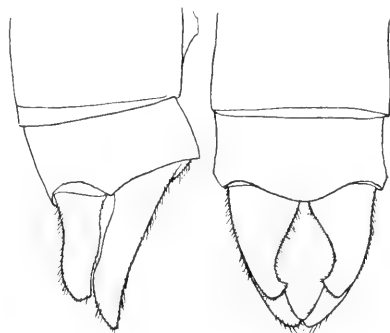


FIG. 19.—*Allocnemis leucosticta*, ♂. Barberton. Appendages, right side and dorsal view.

fully their own breadth. Black colour invading the sides to about two-thirds the distance from humeral suture to metastigma, just a little beyond the (only visible) dorsal end of first lateral suture; sides otherwise very light greenish shading into whitish, right to the ventral side; a narrow, complete black line on second lateral suture. Legs black externally, internally very light greenish or bluish; long spines of tibiae fine and very long, at least three times the angle of the space between each; teeth of claws small, near the tips.

Abdomen slender, deep black; sides of segments 1-2 light greenish; on 3-7 very narrow basal whitish rings shortly interrupted on dorsum; a brilliant creamy yellow dorsal spot on the end of segment 8 and segments 9-10 entirely; on ventral side the tergites 3-7 are narrowly lined with greenish, 8 yellow. Appendages creamy yellow (Text-fig. 19).

Wings of a rather deep, but not pure yellow, shading to grey or



greenish. Pterostigma heavy, opaque, cream to sulphur yellow on dorsal, almost pure white on ventral side.

♀ (adult). Very similar to male. Dark line on second lateral thoracic suture somewhat indistinct, or present only on the dorsal half. Whitish basal rings of abdominal segments narrower. Dorsal spot of terminal segments beginning on anterior half of segment 8, but duller, more reddish brown. Ventral margin of tergites 8-9 lined with yellowish, the line continuing to the dorsal half of valves. Tips of valves slightly exceeding the abdominal end.

Posterior lobe of prothorax raised in the middle, deeply divided in two small rounded lobes, bent slightly forward; on dorsal view this raised part appears cut out of the entire lobe and bent forward over its own base; correspondingly on side view its base is anterior to the margin by the height of the raised lobe except in the median line, where the base is slightly projecting posteriorly.

♂, *Abd.* 32, *hdw.* 22 to 35, *pt.* 25 mm. ♀ 31, 23 to 33, 25.

The series of males from Barberton shows various stages of maturity; it is worth mentioning that the black line of the second lateral thoracic suture appears gradually, and that the yellow colour of the wings is also gradually developed from hyaline through light greenish shades. The females from this locality have according to successive stages of maturity the pterostigma light greyish to rather deep reddish brown, showing no difference between dorsal and ventral side. But there is no reason to consider such specimens as distinct from those with white and yellow pterostigma.

### CHLOROCNEMIS (Sélys, 1863).

A small genus of tropical African species.

The species here described is evidently a stranger to the South African fauna, even at its extreme limits.

#### CHLOROCNEMIS MARSHALLI, n. sp.

British Museum: 1 ♂, Mazoe, 4000 ft., Mashonaland (24. ii. 1905, G. A. K. Marshall). Coll. E. B. Williamson: 1 ♂, Umtali, 3700 ft., Mashonaland (*id.*).

♂ (adult). Labium whitish, pointed with black. Occiput black. Labrum light blue, very narrowly lined with black. Anteclypeus brown; postclypeus black; genae black, but in part within the limits of the blue frontal band.

Frons black; a broad, complete light blue transverse band occupying nearly the anterior half of dorsum, to a very narrow black margin

towards the postclypeus, including posteriorly the base and the first joint of antennae. Prothorax black, with light blue sides, anterior margin, posterior lobe and two transversely oblong dorsal spots. Thoracic dorsum black; broad, complete blue ante-humeral lines nearly equal to the median black part of each mesepisternum; their ventral half touching the humeral suture, dorsal half slightly distant and not quite touching the ante-alar sinus. Black colour invading the sides to half way between the humeral suture and the metastigma; a moderately broad black line on the second lateral suture; sides otherwise blue, shading to whitish on ventral side. Legs long and slender; spines extremely fine, numerous, long; legs black, tibiae

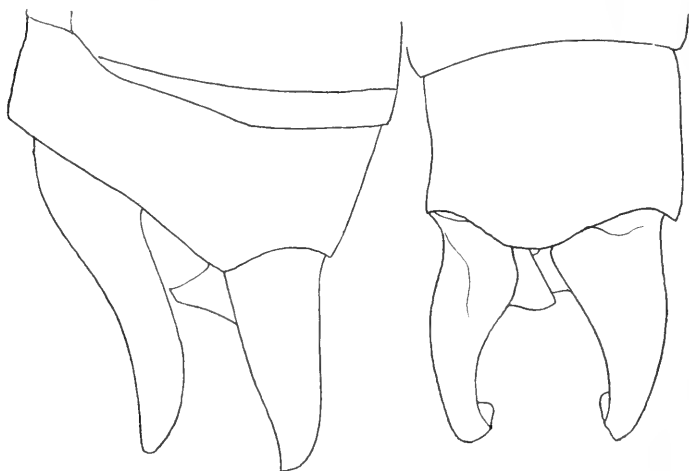


FIG. 20.—*Chlorocnemis Marshalli*, ♂. Mazoe. Appendages, left side and dorsal view.

externally reddish brown; internal side of first femora in basal half, and of second femora wholly shining white (third femora lost).

Abdomen very long and slender, black, marked with light blue and whitish. Segment 1 with sides and a narrow terminal ring whitish; 2 with sides narrowly whitish, a blue mid-dorsal line, much narrowed near the posterior end, the black colour forming a narrowly interrupted U-shaped figure; 3 with a blue mid-dorsal line, broad at base, rapidly narrowed and reaching to two-thirds of the length of the segment as a very narrow line; 4-7 with narrow basal rings; 8-10 with a broad mid-dorsal band, slightly broader than each black margin. Appendages black, the small dilatation near the end of superior light reddish brown. Text-fig. 20.

Wings light greenish yellow. Pterostigma small, nearly square, deep black (Plate VII, fig. 8).

*Abd.* 37·5, *hdw.* 23·5 mm.

# DISPARONEURA (Sélys, 1860).

This genus, the only form in the present fauna representative of the Selysian "Légion Protoneura," includes a considerable number of species, a few of which are recorded from tropical Africa, many more from India, Ceylon, the Malay Peninsula and the western half of the Malay Archipelago.

## DISPARONEURA MUTATA (Sélys, 1886).

Burmeister's *Agriion glaucum* was mistaken by Sélys for this species and consequently described as *D. glauca*; but Calvert proved Burmeister's species to be the *Enallagma glaucum* of the present paper. Very probably *Disparoneura mutata*, also described by Sélys from the MacLachlan Collection, is our species, and certainly it is the same which Calvert described under that name; this author gives a small but very characteristic figure of the male appendages (printed upside down).

The name here adopted appears therefore well established.

S. Afr. Mus.: 2 ♂, 1 ♀, Waterval, Transvaal (12 . x, 10 . xi . 1899; 6 . xi . 1902); 5 ♂, 7 ♀, M'Fongosi, Zululand (iii, iv, x, i, xii . 1911, W. E. Jones). Mus. Brussels (formerly de Sélys Collection): 1 ♀, *Dispar glauca*, ♀, Brit. Mus. (Sélys' hand) (Stev.); Port Natal (Hagen's hand). Brit. Mus.: 1 ♀, Willow Grange, Mooi River, Natal (30 . i . 1913, R. C. Wroughton); 1 ♀, Colenso, Weenen, Natal (30 . i . 1913, R. Turner); 1 ♂ ♀, *in cop.*, Mazoe, 4000 ft., Mashonaland (25 . xii . 1905, G. A. K. Marshall). Mus. Stockholm: 1 ♂, 1 ♀, Caffraria (Wahlberg); 1 ♂, Salisbury, Mashonaland (x . 1903, Marshall). Coll. K. J. Morton: 1 ♂, Durban, Natal (27 . i . 08, Miss Fountaine); 1 ♀, King Williamstown (4 . i . 08, ead.); 1 ♀, Stutterheim (9 . i . 08, ead.). Coll. E. B. Williamson: 9 ♂, 6 ♀, Princetown, Natal (7, 30 . xii . 1909, G. F. Leigh); 1 ♂, 1 ♀, Salisbury (x . 1900, Marshall). Coll. Ris: 1 ♀, Rikatla, Delagoa Bay (1 . x . 1913, H. Junod); 4 ♂, 2 ♀, Botchabelo, 1200 m., Transvaal (18 . ii . 1914, *id.*).

♂ (adult). Labium dark brown to almost black. Occiput dark brown, black in the middle with bluish pruinosity. Labrum, anteclypeus, postclypeus and dorsal surface of head wholly black, a transverse band of dense bluish pruinosity between postclypeus and ocelli.

Prothorax black, slightly bluish pruinose; posterior lobe broad, regularly curved, not raised, with a slightly prominent narrow mid-dorsal ridge, its anterior margin being a straight edge slightly projecting laterally at the ends. Thoracic dorsum black, pruinose blue not quite to the humeral suture; the black colour, somewhat metallic green and not pruinose, invades the side to near the level of the metastigma; on the metastigma a narrow reddish-brown line; a broader black one on second lateral suture; ventral half of metepimeron reddish brown; also the metasterna except narrow lateral lines and small median dots; sides from the first (obliterated) lateral suture and ventral side whitish pruinose. Legs black, femora and tibiae bluish pruinose; spines fine and very long; tooth of claws small, near the end.

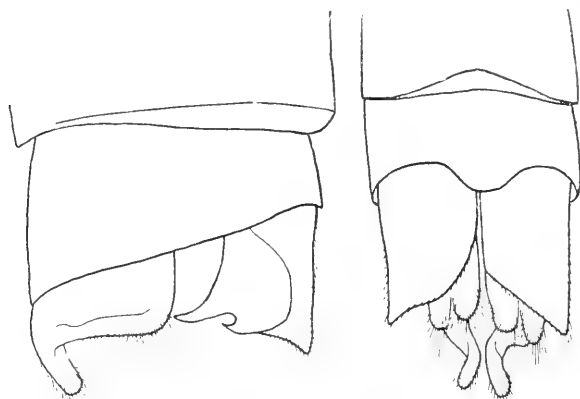


FIG. 21.—*Disparoneura mutata*, ♂. M'Fongosi. Appendages, left side and dorsal view.

Abdomen very slender, black; segments 1-2 and also 8-10 pruinose greyish blue; sides of 1-2 narrowly yellowish brown; 3-6 with very narrow, dorsally interrupted basal whitish rings, and the sides dull reddish brown except a terminal black ring of nearly one-fifth the segments' length; on 2-6 a very narrow mid-dorsal whitish line. Appendages blackish (Text-fig. 21).

Wings hyaline; pterostigma dark reddish brown to almost black.

♀ (adult). Labium and occiput light reddish brown.

Dorsal surface of head light reddish brown with black markings; a dot on labrum and anterior margin of anteclypeus, two dots on postclypeus, very narrow, a complete transverse line at base of antennae, somewhat broader transverse line between posterior ocelli and occipital margin, this latter black band irregularly indented posteriorly.

Prothorax light reddish brown, marked with black dorsally in the middle and the sides, both parts indented posteriorly by reddish brown. Posterior lobe divided into two pairs of processes; the median ones nearly a horizontal plane and slightly convergent with their broadly rounded ends; the lateral ones nearly vertical, somewhat longer and narrower, their rounded ends slightly divergent; medial processes black, lateral ones reddish, black in their distal half in very mature specimens. Thoracic dorsum light reddish brown lined with black; a line over the median suture and the ante-alar sinus; a narrow, ventrally incomplete line near the median suture; an equally narrow, complete line on the humeral suture. Sides black from the humeral suture to half way towards the metastigma, this colour interrupted by a narrow, cuneiform, ventrally incomplete reddish band near the humeral suture and a round spot on the mesinfraepisternum; sides and ventral side otherwise light reddish brown, very slightly whitish pruinose, a narrow black line on second lateral suture. Legs very light reddish brown; lines on first and second femora, rows of points on third femora, internal side of tibiae, tarsi and spines black.

Abdomen light greyish brown marked with black; a transverse dorsal line and lateral points near the posterior end of segment 2; on 3-6 terminal rings, slightly distant from the end and narrowing to a complete mid-dorsal longitudinal band which is divided by a fine median whitish line; 7-10 reddish brown dorsally; this colour narrows on 7, and is broader on 8-10; sides black, interrupted on 7 by a longitudinal reddish line. Valvae black, not exceeding the abdominal end.

Pterostigma slightly larger than in male, its colour lighter. Immature females are light yellowish brown to almost white; all dark markings are absent, except the thoracic lines (which are also reduced in extent and less deep in colour), the lateral black of segments 8-10 and the terminal dorsal points on 3-6. First to appear are evidently the transverse lines on head, last the longitudinal stripes on segments 3-6. Immature males are much like the females at the same stage, their abdomen being almost pure white.

♂, *Abd.* 26, *hdw.* 19 mm. ♀, 29, 19 to 30, *pt.* 2.1.

Vein  $A^*$  is slightly variable; most specimens are like Plate VII, fig. 9, viz. with  $A^*$  very nearly parallel to the anal side of 9, ending in the middle of the cross-vein which continues the distal side of 9 to the wing's edge, or bent only very slightly towards the anal margin.

In some specimens this deflection is stronger, in one male to the confluence of  $A^*$  with the anal end of said cross-vein; in one (otherwise abnormal) the hind wing of a female  $A^*$  reaches the anal margin at one half the length of 9.

## METACNEMIS (Sélys, 1863).

This genus, placed by Sélys in his "*Légion Platycnemis*" (see p. 288) is characterised by some important venational features; the quadrangle approaching the rectangular form (but less so than in the genera *Allocnemis*, *Chlorocnemis* and *Disparoneura*),  $A^*$  separating from the wing's edge at a level widely proximal to the cubito-anal cross-vein, about three times the length of this vein; *Cu* 2 broken at the level of nodus or even proximal thereto; the antenodal cross-veins being closely set and convergent towards *R*. Besides these characters drawn from reticulation, the long spines of the legs, the *Agrion*, not *Platycnemis*-like shape of head give to *Metacnemis* and the small group of allied African species a decided resemblance to the large American genus *Argia*, a resemblance which might well be one of real affinity and not of mere convergence.

## METACNEMIS VALIDA (Sélys, 1863).

Coll. K. J. Morton: 1 ♀, King Williamstown (4. i. 1908, Miss Fountaine).

Mr. Morton very kindly agreed to sacrifice this unique specimen for the purpose of obtaining a good photographic figure of a most remarkable pair of wings as given in Plate VII, fig. 10.

♀ (somewhat immature). Labium broad, median lobe not conspicuously cleft, nearly semi-circular in outline, with a very small and shallow notch and a fine median suture over the whole length; very light reddish brown, median lobe whitish. Occiput dull reddish brown. Labrum, anteclypeus, postclypeus, frons and vertex light ferruginous, rather densely covered with long, soft, blackish hair. Postclypeus broad, projecting slightly over the labium, anteclypeus very narrow (perhaps by compression). No transverse ridge on the frons; in front of base of antennae two transversely oval low tubercles; ocelli very small, the posterior ones on slightly elevated bases. Transverse edge of occiput very long, distance of eyes great.

First and second antennal joints short, third about three times the length of second; ferruginous to end of third joint, the rest black.

Prothorax ferruginous, narrowly obscure in the impressed lines. Structure of posterior lobe very complicated. Hind margin of anterior lobe concave posteriorly in its median third, the almost semi-circular concavity bordered by an elevated ridge, low in the middle, elevated in obtusely triangular blades at the lateral ends;

the posterior lobe fits into this concavity as a trapezoid process, very slightly narrower posteriorly; on this lobe a transverse anterior ridge, almost vertical and rather high, cut in a straight line with slightly projecting lateral ends; further, two lateral longitudinal ridges, low anteriorly, rising at the posterior end, arched on lateral view. The posterior, nearly straight edge of this lobe fits on the mesothorax into a groove between two narrowly triangular, transverse mesostigmal laminae.

Thorax ferruginous, gradually shading into lighter tints laterally and posteriorly; a blackish dot in the dorsal end of humeral suture; a very narrow black line on dorsal edge of mesepimeron; black dots on anterior and posterior dorsal end of metepimeron.

Legs long and robust. Spines of femora and tibiae long, fine and very numerous, about 15 on each side of third femora, 12 on third tibiae. Tooth of claws robust near the point. Legs light yellowish brown, internal side of tibiae, tarsi and spines black.

Abdomen comparatively robust, dull reddish brown; terminal joints of segments 1-7 narrowly blackish; from 2-7 a narrow somewhat diffuse dark longitudinal mid-dorsal line, widened into a fine transverse line near the end of each segment. Posterior edge of tenth segment with a small triangular notch, and a group of small blackish spines on each side. Appendages very small, yellowish. Valvae moderately long, the styloids just reaching the end of abdomen.

Wings (Plate VII, fig. 10) light greyish yellow, from base to nodus in costal half to distal end of quadrilateral in anal half deeper yellow. Pterostigma whitish yellow, very opaque.

*Abd.* 32, *hdw.* 28.5 mm.

The male as described by de Selys and very probably also the adult female must be very much darker insects.

#### PSEUDAGRION (Selys, 1876).

As originally defined by de Selys this genus embraces a large number of species inhabiting the inter-tropical regions of the Old World, a few of them extending beyond the limits of the tropics in South Africa, in Australia, and along the frontier of the Palaearctic region. Continental Africa appears as the chief centre of *Pseudagrion*, not less than 24 species from this continent being known to the writer. Unfortunately in the actual state of literature their identification is extremely difficult; nearly all existing descriptions are given without the all-important figures of structural details, and many of them are not comparative at all; thus their condition may

well be termed chaotic, and it is to be hoped that a paper on its 24 species prepared by the writer will contribute to some extent to bring light into this tediously obscure matter. The following table and descriptions of nine regional species are an extract from that more extensive study.

The original generic definition cannot (as in many other cases) be literally applied, unless unnatural and undesirable sub-divisions be the consequence. The origin of  $A^*$  at the *Cuq* (and not proximal), although an important feature on the whole, must be interpreted with some allowance to a more proximal origin, even for as much as nearly the length of *Cuq* itself; variation between nearly allied species and even individuals of the same species makes such an allowance necessary. The same must be said of the most important structural character of the female sex, the styloid processes of the posterior prothoracic border (*P. acaciae*). Absence of light-coloured postocular spots would exclude the two species *furcigerum* and *caffrum*, otherwise clearly congeneric, had we to apply the definition literally. No writer on systematics will fail to observe that giving definitions in a few words and applying them to the letter will very often be satisfactory as long as a limited faunal district is under observation, or a small proportion of existing forms only known; but with an increasing knowledge, and the extension of the area under discussion, the matter becomes rapidly more difficult, and with a clear insight into natural affinities it may be impossible for the moment to give any short and comprehensive definitions to do justice to such affinities. Of course minute subdivision of genera will apparently overcome such difficulties, but the advantage is much more apparent than real; it is often better to wait for the right word to be found at some later date for a new definition of an old genus than splitting it up into fragments for the apparent needs of the moment.

The following table is given for the males only.

Females may be identified by consulting the single descriptions, and it must not be forgotten that isolated females will sometimes present great difficulties and even be found impossible of identification. The reason is obvious: definition of species is largely based on the structural characters of the males, and even the colour schemes are much more precisely differentiated in this sex. As a rule, a very intimate knowledge of a group—a knowledge accessible in many cases only to the naturalist observing the species in nature—is needed for ready identification of closely-allied females that lack structural characters. This is true for many of the *Agrionidae* and obvious for *Pseudagrion*.



1. No light-coloured postocular spots. Thoracic dorsum bronze black without ante-humeral stripes . . . . . 2.  
Light-coloured postocular spots present. Thoracic dorsum mostly with ante-humeral stripes . . . . . 3.
2. Labrum and frons anteriorly olive-green. Pterostigma greyish brown. Superior appendages with an acute sub-basal medial tooth *furcigerum*. Labrum and frons bright orange-yellow. Pterostigma carmine. Proximal sub-basal median tooth of superior appendages truncate . . . *cafferum*.
3. Postocular spots round or transversely oval, often united by a line along the occipital margin. Frons black anteriorly to the postocular spots, at least to base of antennae . . . . . 4.  
Postocular spots very large, mostly reddish, lined anteriorly at most by a narrow black band, the dorsal surface of head being thus chiefly red. Superior appendages not distinctly furcate . . . . . 7.
4. Thoracic dorsum and abdomen of adult specimens more or less pruinose blue; light markings bluish or greenish; postocular spots separate. Comparatively robust species . . . . . 5.  
No pruinosity on thorax and abdomen of adult specimens. Light markings on head reddish or orange, on thorax shading from yellowish to bluish. Postocular spots united by a transverse line. Very slender form. Dorsal branch of superior appendages in lateral view much narrower than ventral one, slightly hooked. Pterostigma reddish brown *angolense*.
5. Labrum dull olive-green or bluish . . . . . 6.  
Labrum deep black. Ante-humeral stripes broad, greenish in more or less immature specimens, pruinose blue in adults. In superior appendages viewed laterally the ventral branch projecting a long way beyond the dorsal one . . . . . *praetextatum*.
6. Thoracic dorsum entirely bronzy black with slight greyish pruinosity; at most a very slight indication of ante-humeral lines. Branches of superior appendages in lateral view of almost equal length, the dorsal slightly more obtuse than the ventral one. Pterostigma blackish. Smaller species . . . . . *salisburyense*.  
Thoracic dorsum pruinose blue; close to the humeral suture a narrow, somewhat irregular, sometimes interrupted greenish or olivaceous line. Superior appendages in lateral view, with the ventral branch obliquely ascending as a rather narrow border to the somewhat shorter and rounded dorsal branch. Pterostigma dull red. Largest species of the present fauna . . . . . *natalense*.
7. Postocular spots entirely bordered with black. Dorsum of second abdominal segment predominantly black . . . . . 8.  
Postocular spots only partially and sometimes incompletely bordered with black, confluent to the concolorous occiput or frons. Dorsum of second abdominal segment predominantly blue, with a U-shaped black mark. Black lines of thoracic sutures very narrow . . . . . *acaciae*.
8. Comparatively short and robust species, in size much like the preceding one. Black lines of thoracic median and humeral sutures comparatively broad and sinuate. Dorsum of second abdominal segment black including one or two bluish points . . . . . *massaicum*.  
Slender and more elongate species. Black lines of thoracic sutures narrow. Dorsum of second abdominal segment black . . . . . *sjöstedti*.

## PSEUDAGRION FURCIGERUM (Rambur, 1842).

Of this species, Rambur's type in the de Selys' Collection at Brussels is the only specimen known to the writer. It is testified to as being that type by the following labels: *furcigerum* (Selys' hand) / Ramb. (*id.*) / *furcigera* (Rambur's hd.) / Cap. (*id.*). There are other specimens associated with the type, but they belong to different species.

The specimen is in an adult male, with the colours not in good condition; but the appendages were found in sufficiently good condition for a drawing, which will, it is hoped, facilitate the identification

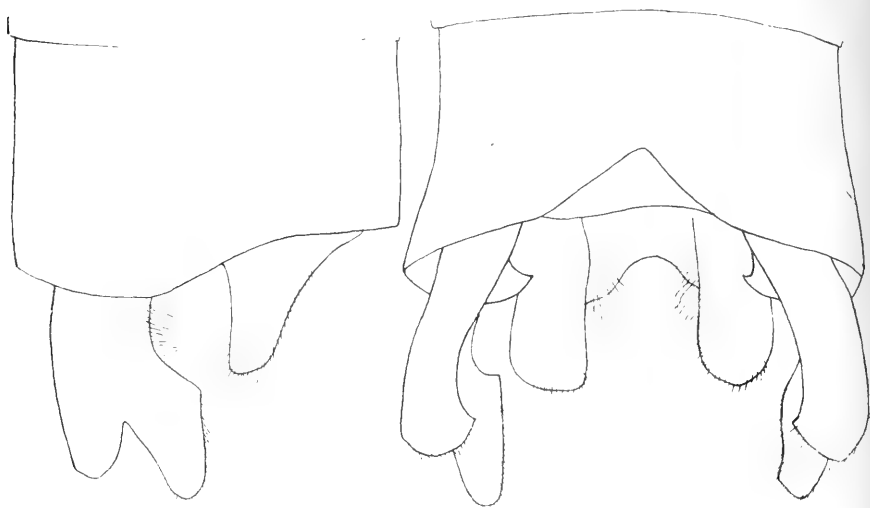


FIG. 22.—*Pseudagrion furcigerum*, ♂. Cape. Appendages, right side and dorsal view.

of the species. Occiput and labium yellowish. Labrum, anteclypeus, base of mandibles and genae olivaceous. Dorsum of head, prothorax and thorax black. Sides of prothorax narrowly yellowish; sides of thorax yellowish or olivaceous, this colour beginning somewhere between the humeral suture and the stigma, but nearer the latter; the exact limits not visible, as the thorax is partly destroyed. Legs black on the lateral, light olivaceous on the medial service. Abdomen comparatively short and robust; dorsum wholly black, sides yellowish olivaceous. Appendages blackish (Text-fig. 22). The superiors are similar in outline to those of *praetextatum*, but more robust, the ventral branch shorter, a strong sub-basal acute tooth projecting from the lower edge of the dorsal branch. Origin of *A*\* distinctly

proximal to *Cu*<sub>2</sub>, but not by the entire length of that vein. Pterostigma narrow, the distal side very oblique, dull greyish brown.

*Abd.* 30, *hdw.* 21.5 mm.

**PSEUDAGRION CAFFRUM (Burmeister, 1839).**

Coll. K. J. Morton: 1 ♂. Brit. Mus.: 3 ♂, 2 ♀, Willow Grange, Mooi River, Natal (20 . i, 1 . ii . 1913, R. C. Wroughton).

♂. Occiput and labium whitish. Labrum orange with one to three blackish dots at base. Anteclypeus orange; postclypeus black, narrowly lined with orange anteriorly; frons orange to the base of

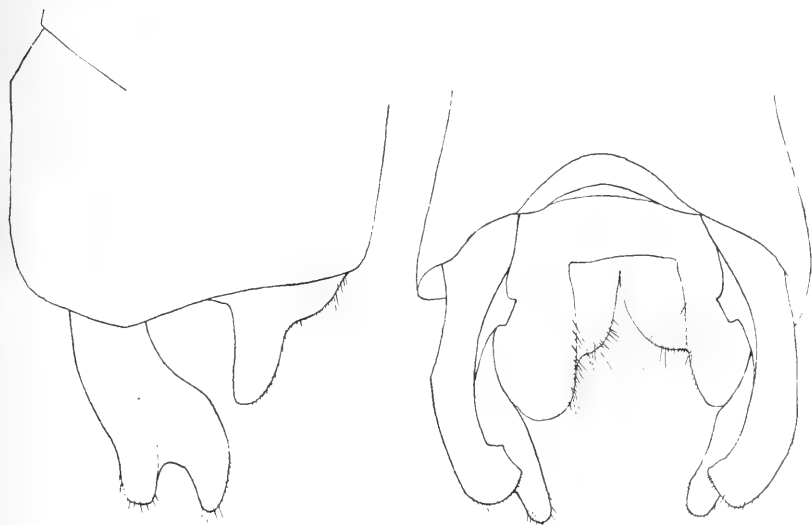


FIG. 23.—*Pseudagrion cafferum*, ♂. (Coll. Morton.) Appendages, right side and dorsal view.

antennae and anterior ocellus. Dorsal surface of head otherwise deep bronze black, no postocular spots. Prothorax bronze black, sides narrowly whitish. Thoracic dorsum bronze black, this colour invading the sides to half way between humeral suture and metastigma, still further at the dorsal end. Sides otherwise greenish yellow with thin whitish pruinosity; a black dot in the dorsal third of second lateral suture. Ventral side whitish. Legs light greenish yellow on the medial surface, on the lateral surface broad deep black lines on femora, narrower ones on tibiae. Abdomen relatively short and stout. Dorsum bronze black, rather densely pruinose blue; sides light greenish yellow on segments 2 to 5, greenish blue on 6 to 10. Appendages (Text-fig. 23): Dorsal branch of superior black, ventral

branch and inferior light reddish yellow. *A*\* very slightly proximal to *Cuq* in front wing, scarcely so or at *Cuq* in hind wing. Pterostigma very small, bright red or orange; the distal costal angle very acute.

♀. Head anteriorly as in male, or of a more dull olivaceous colour; the black on postclypeus limited to a narrow basal spot; rather large, transversely oval, olivaceous postocular spots united by a narrow line on the occipital ridge. Prothorax black, a small dorsal, two larger lateral spots and the sides dull orange. Posterior lobe convex in the middle; the usual styles long and narrow, depressed; styles and a point on the lobe orange. Thoracic dorsum black; broad ante-humeral bands and a narrow line on median suture dull orange; black colour not reaching fully to humeral suture at the upper, slightly beyond at lower end; small black dots in dorsal end of first and second lateral sutures. Black lines on legs much narrower than in male. Dorsum of abdomen black, only segments 1-2 and 8-10 slightly bluish pruinose. Sides dull olivaceous, orange or greenish blue. Wings as in male.

♂, *Abd.* 25, *hdw.* 19 mm. ♀, 25, 20.

Calvert gives a very exact description of Burmeister's type-specimen and a figure of the appendages. Although in the latter the truncate sub-basal median tooth is not shown, the figure and description agree otherwise so perfectly with our specimens that very little doubt remains about their identity.

#### PSEUDAGRION ANGOLENSE (Selys, 1876).

S. Afr. Mus.: 6 ♂, M'Fongosi, Zululand (iv, v, xii. 1911, W. E. Jones); 1 ♂, Barberton, Transvaal (i. 1912, H. Edwards). Coll. K. J. Morton: 1 ♂, Macequece (9. x. 1908, Miss Fountaine). Brit. Mus.: 1 ♂, Brit. East Africa, S.E. slopes of Kenya, 6000-7000 ft. (3-12. ii, 1911, S. A. Neave); Mus. Brussels, de Selys' Coll.: 1 ♂ (Angola—MacLachlan's hd.), cotype.

♂. Occiput and labium light greyish ochreous, labrum orange with three basal blackish dots; genae and anteclypeus orange; postclypeus black. Frons and vertex black with orange markings; broad transverse band over the base of antennae, laterally turning to the same colour as the genae; good-sized transversely oval postocular spots, united by a narrow line on occipital ridge. Prothorax black, sides lined with dull yellow; three orange spots, one transverse at the anterior margin, two triangular ones on the disc. Posterior lobe narrow, erect, black in the middle, narrowly lined with orange on sides.

Thoracic dorsum black, slightly bronzy; narrow greenish ante-humeral lines distant from humeral suture by about their own breadth.

Black colour invading the sides to about half-way between the humeral suture and metastigma; sides otherwise greenish; a complete narrow black band on second lateral suture; a similar band on dorsal half of (obliterated) first lateral suture, joining the humeral black colour at dorsal end. Metepimeron and metasterna slightly whitish pruinose. Legs light reddish brown, black lines on lateral surface, broad on femora, narrow on tibiae. Abdomen very slender; segments 1-7 bronzy black dorsally, light greenish yellow on sides; 8-10 greyish blue (probably bright blue in living insect).

Appendages (Text-fig. 24) blackish. In some specimens the ventral

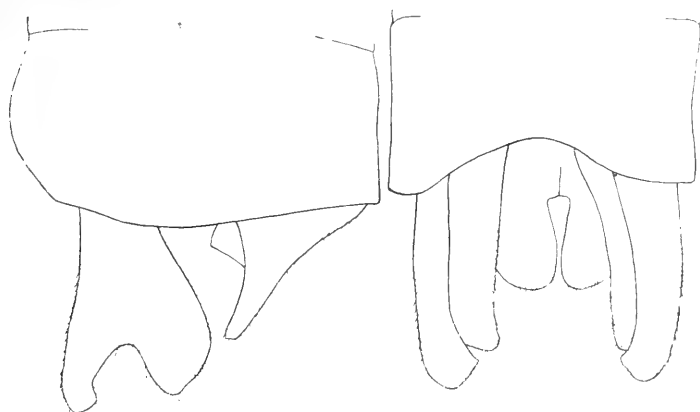


FIG. 24.—*Pseudagrion angolense*, ♂. M'Fongosi. Appendages, right side and dorsal view.

medial margin of dorsal branch is seen to end proximally in a sharp, upturned, medially protracted angle, those of both sides touching in median line; in others this structure is concealed by the tenth segment (as in the specimen figured). Wings slightly tinged with yellowish. *A\** at *Cuq*. Pterostigma rather long, not very oblique, reddish brown.

No females in the examined collections.

♂, *Abd.* 33, *hdw.* 21.5 to 35.5, *pt.* 2.4 mm. (M'Fongosi).

The co-type from Angola is slightly more robust, comparatively large (*Abd.* 35, *hdw.* 24 mm.). There can be no doubt about the identity.

#### PSEUDAGRION PRAETEXTATUM (Selys, 1876).

S. Afr. Mus.: 28 ♂, 20 ♀, M'Fongosi, Zululand (ii, iii, iv, v, x, xi, xii. 1911, W. E. Jones); 14 ♂, 12 ♀, Barberton, Transvaal (v. 1911, Edwards); 1 ♂, Blue Cliff, Dunbrody (ii. 1912). Brit. Mus.: 1 ♂,

Salisbury, Mashonaland (iv . 1904, G. A. K. Marshall); 1 ♂, 2 ♀, Mazoe, 4300 ft., Mashonaland (29 . xii . 1905, *id.*); 3 ♂, Kambove, 4-5000 ft., Katanga (14 . ii, 16 . vi . 1907, S. A. Neave); 1 ♂, N.W. shore of L. Nyassa, from Florence Bay to Karonga, 1650 ft. (30 . vi, 6 . vii . 1910, *id.*); 1 ♂, Nyassaland, Valley of S. Rukuru Riv., 3000 ft. (20-27 . vi . 1910, *id.*). Coll. K. J. Morton: 1 ♂, Durban, Natal (15 . iv . 1908, Miss Fountaine); 1 ♂, 1 ♀, Macequece (7 . ix . 1908, *ead.*). Mus. Hamburg: 1 ♂, 3 ♀, Uropapa, near Grootfontein, S.W. Africa (1913, H. Thomsen); 2 ♂, 2 ♀, Grootfontein (7-11 . vi . 1911, W. Michaelsen). Coll. E. B. Williamson: 6 ♂, 5 ♀, Princetown, Natal (xii . 1908; ii . 1909, G. F. Leigh).

This species is recorded, and also known to the writer, from other regions of East Africa, not contiguous with our faunal district, northward to Abyssinia; but it is not yet known from tropical West Africa.

♂. Occiput and labium light ochreous yellow. Labrum shining black. Ante- and postclypeus dark brown to almost black; genae dull olivaceous. Frons and vertex black; frons whitish pruinose anteriorly to base of antennae and anterior ocellus. Very small, almost circular, dull greenish postocular spots. Prothorax black, somewhat lighter at the sides, rather densely whitish pruinose. Thoracic dorsum black, a narrow line on median suture and a broad ante-humeral band pruinose blue; the latter about half the breadth of each mesepisternum, touching laterally the humeral suture. Sides rather densely pruinose, but the pattern still recognisable; black from humeral suture to half-way to metastigma, also a line in dorsal end of first (obliterated) and a rather broad band on full length of second lateral suture. Ventral surface ochreous with sutures lined with black to almost black, whitish pruinose. Legs black, external side of tarsi and claws reddish brown, femora pruinose.

Dorsum of abdomen black, pruinose blue, the pruinosity ending at narrow black terminal rings of segments 3-7; sides dull reddish brown. Appendages (Text-fig. 25) dull reddish brown, tips of superior blackish. The most characteristic feature is the long inferior branch, beginning with a rather sharp angle, and the absence of a sub-basal median tooth.  $A^*$  at *Cuq* or very slightly proximal; pterostigma dark brown to almost black, comparatively large, its costal distal angle very acute.

♀. Black and light olivaceous, sometimes with a more yellowish tinge, the black markings much reduced. Labrum only dark at base, but this colour not deep black; anteclypeus olivaceous, postclypeus obscure anteriorly; frons olivaceous to base of antennae and anterior ocellus.

Postocular spots larger than in ♂, transversely oval, connected by a line over the occipital margin. Prothorax black in the middle with two median olivaceous spots, olivaceous in front and on the sides. Posterior lobe black in the middle to base of styles, styles olivaceous with blackish point. Thoracic dorsum as in male, but light olivaceous instead of pruinose blue. Sides olivaceous, the black band at humeral suture narrow, scarcely more than one-half as broad as ante-humeral stripe; in dorsal end of first and second lateral sutures only small blackish dots. Legs very light yellowish; narrow, partially interrupted black lines on lateral surface of femora.

Dorsum of abdomen bronze black, sides olivaceous, passing ventrally into yellowish; very narrow basal olivaceous rings on segments 3-7;

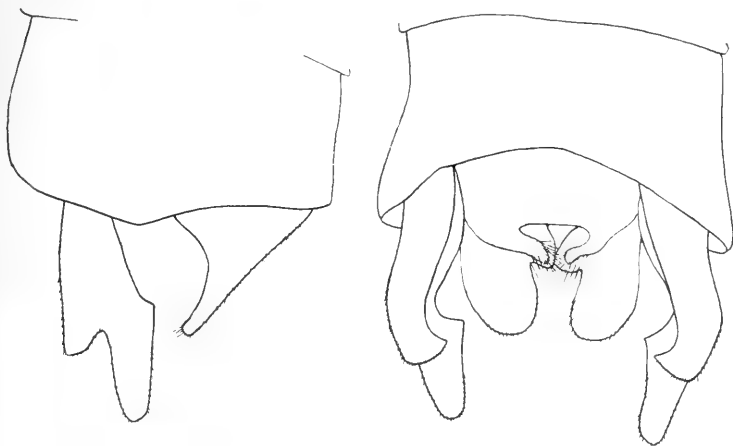


FIG. 25.—*Pseudagrion praetextatum*, ♂. Barberton. Appendages, right side and dorsal view.

dorsal olivaceous spot on posterior half of 9 and 10 entirely. Appendages blackish. Pterostigma in shape like male, but very light greyish yellow.

♂, Abd. 30, hdw. 20.5 to 32, pt. 2.2 mm. ♀, 31, 22 to 32, pt. 2.3.

This species is undoubtedly de Selys' *P. praetextatum*, the types of which (from Zanzibar) were compared with our South African series. Considerable uncertainty exists about the older names *Kersteni* and *Deckeni*, both given by Gerstaecker to specimens from the region of Mombasa. It is possible that one or both of these names (absolute priority would belong to the name *Kersteni*) apply to the species here described; but since no certainty could be reached, it was thought preferable to adopt the name for which the types could be examined.

## PSEUDAGRION SALISBURYENSE, n. sp.

S. Afr. Mus. : 2 ♂, M'Fongosi, Zululand (iii, ix . 1911, W. E. Jones); Waterberg, S.W. Protectorate (i . 1920, Tucker); 1 ♂, King Williamstown Distr., St. Mathew's (R. M. Lightfoot, 1894). Brit. Museum, Mus. Stockholm and Coll. E. B. Williamson: 9 ♂, 12 ♀, Salisbury, Mashonaland (i, ii, x . 1900; x, xi . 1903; iv, 1904; iv, 1905, G. A. K. Marshall). Coll. E. B. Williamson: 5 ♂, 3 ♀, Princetown, Natal (xii . 1908, 1 . ii . 1909, G. F. Leigh).

♂. Occiput and labium greyish ochreous. Labrum, ante- and postclypeus and genae dull olivaceous, rather obscure. Frons black to the anterior margin, slightly bronze-green. Postocular spots small, almost circular, dull olivaceous. Prothorax black, very narrowly

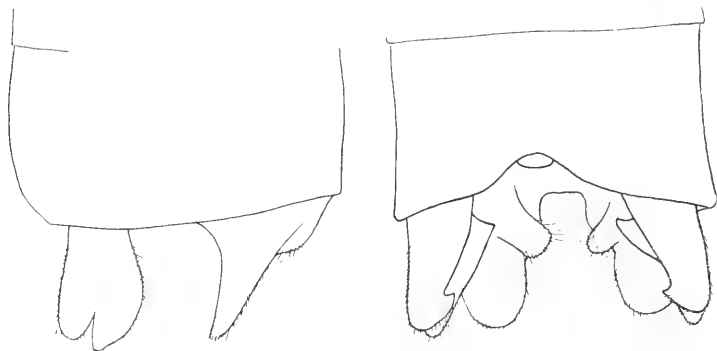


FIG. 26.—*Pseudagrion salisburyense*, ♂. King Williamstown. Appendages, right side and dorsal view.

reddish-brown on sides, slightly bluish pruinose. Thoracic dorsum wholly bronze black, very slightly bluish pruinose; the pruinosity a little more dense in a stripe near the humeral suture (only in part of specimens examined). Black colour invading the sides to half-way between humeral suture and metastigma; broad black band on second lateral suture, slightly incomplete ventrally; this band confluent dorsally with the anterior black colour in part of specimens. Sides and ventral surface otherwise very light reddish brown, with thin whitish pruinosity. Legs black, external surface of tibiae and tarsi ochreous, femora whitish pruinose. Dorsum of abdomen bronze black; segments 1 to middle of 2 bluish pruinose, 8-9 violet-blue (in pigment) with the lateral border narrowly black. Appendages (Text-fig. 26) superior dark brown, inferior reddish ochreous. *A\** at *Cuq*; pterostigma varying from greyish ochreous to almost black according to



maturity; pterostigma somewhat narrower than in *praetextatum*, costal-distal angle very acute.

♀. So similar to the female of *praetextatum* that it is scarcely to be distinguished otherwise than by its smaller size. The relation of both females to the respective males is made certain by pairs taken in copulâ.

♂, *Abd.* 26.5, *hdw.* 19 mm. ♀, 27.5, 21.

PSEUDAGRION NATALENSE, n. sp.

S. Afr. Mus.: 8 ♂, 5 ♀, M'Fongosi, Zululand (iii, iv, v, ix, x, xi. 1911, W. E. Jones). British Museum: 1 ♂, 1 ♀, Willow Grange, Mooi River, Natal (20, 21. i. 1913, R. C. Wroughton). Coll. K. J. Morton: 1 ♂, Stutterheim, Cape Colony (13. i. 1908, Miss Fountaine).

♂. Occiput and labium dull ochreous. Labrum olivaceous brown, a black point at base. Anteclypeus very dark olivaceous, postclypeus blackish, genae light olivaceous brown. Frons and vertex black; a band of dense whitish pruinosity between base of antennae and anterior ocellus posteriorly and the base of postclypeus anteriorly. Postocular spots comparatively large, transversely oval, dull greenish. Prothorax black, sides rather narrowly reddish ochreous, slightly whitish pruinose. Thoracic dorsum bronze black, slightly whitish pruinose; very narrow, greenish ante-humeral lines, complete or interrupted, nearer to humeral than to median suture. Dark colour invading the sides to not fully half-way between humeral suture and metastigma; narrow black lines on dorsal half of (obliterated) first, on full length of second lateral suture; sides and ventral surface otherwise light ochreous. Legs black, external side of tibiae and tarsi ochreous, femora pruinose. Dorsum of abdomen bronzy black with rather dense, greyish-blue pruinosity, gradually diminishing to the terminal segments; sides and ventral side light reddish ochreous. Appendages (Text-fig. 27) reddish ochreous, dorsal branch of superior blackish.  $A^*$  at *Cuq* or very slightly proximal; pterostigma very narrow, proximal-anal and distal costal angle almost equally acute, very light reddish-brown to almost pure red.

♀. Similar to *praetextatum*, but easily distinguished by its larger size and peculiar narrow shape and the reddish colour of the pterostigma. Labrum, ante- and postclypeus, genae, frons to anterior ocellus orange-brown. Postocular spots larger than in male, dull greenish, connected by a narrow line over the occipital margin. Prothorax with a longitudinal median band and two lateral spots olivaceous; posterior lobe rather prominent, almost semicircular;

styles narrow, half as long as prothorax, olivaceous, black at tips. Light colours of thorax olivaceous brown to dark bluish green; rather broad band on median suture, very broad ante-humeral stripe; black band at humeral suture, but half as broad as ante-humeral stripe; very minute black dots in dorsal end of first (obliterated) and second lateral suture. Legs light olivaceous; narrow black lines on lateral surface of femora. Dorsum of abdomen bronzy black, segments 8-10 dull bluish olivaceous, almost complete lateral bands on 8 and lateral anterior spots on 9 black. In very adult specimens interalar space and dorsum of segments 1-3 bluish pruinose. Pterostigma as in male, more reddish brown than pure red.

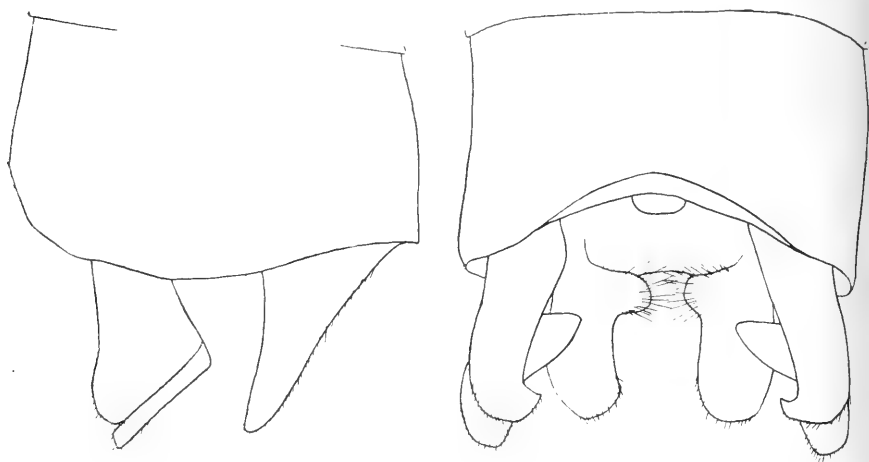


FIG. 27.—*Pseudagrion natalense*, ♂. M'Fongosi. Appendages, right side and dorsal view.

♂, Abd. 33, hdw. 24 mm. ♀, 35, 26.5.

This comparatively large species is in stature and system of coloration very similar to a species from tropical East Africa, which I believe I identify correctly as *P. Gerstückeri*, Karsch; but *natalense* differs from that species by the peculiar shape of the dorsal branch of the superior appendages.

#### PSEUDAGRION ACACIAE (Förster, 1906).

S. Afr. Mus.: 7 ♂, 6 ♀, M'Fongosi, Zululand (iii, iv, xi, xii. 1911, W. E. Jones). Brit. Mus.: 1 ♀, Nyassuland, lower Shire Valley, near Chikawa, 600 ft. (12-16. iv. 1910, S. A. Neave); 1 ♂, N.E. Rhodesia, Niamazi River, near Nawalia, 2000 ft. (17-22. vii. 1910, *id.*); 1 ♂,

N.E. Rhodesia, mid. Luangwa Valley, 13-1800 ft. (23-31 . viii . 1910, *id.*).

♂. Occiput whitish, a small dark spot at the foramen. Labium light ochreous, labrum, ante- and postclypeus, genae, frons to level of posterior ocelli brick red; towards the occipital margin greenish or bluish shades become gradually mixed to this colour. Very scanty black markings; a point in front of anterior ocellus, short and narrow dots at side of same; in level of posterior ocelli fragments of a narrow transverse band; a few points on occipital margin; a kind of very large postocular spots are indistinctly limited by these markings. Antennae red, terminal joints obscure.

Prothorax light yellowish red, laterally shading to whitish; narrow black lines in the transverse sutures. Thoracic dorsum yellowish red,

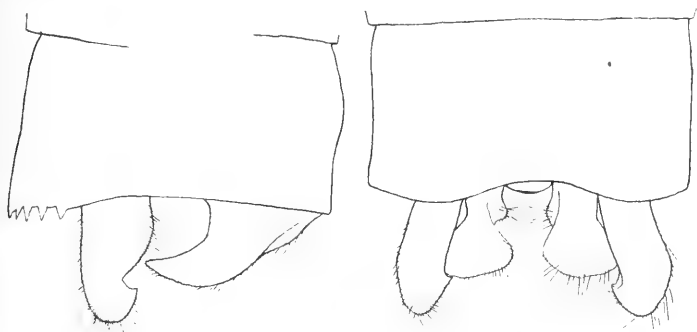


FIG. 28.—*Pseudagrion acaciae*, ♂. M'Fongosi. Appendages, right side and dorsal view.

sides very light greenish, shading gradually to whitish and slightly pruinose ventrally and posteriorly; marked with blackish; complete narrow line on median suture; complete slightly broader line at humeral suture, broader in ventral half and behind the suture than across the suture and very narrow at dorsal end; small dots in dorsal end of first and second lateral sutures. Legs black, external surface of tibiae and tarsi light reddish ochreous; femora pruinose. Abdomen comparatively short. Segments 1-7 dull greenish blue, with bronze-black marks; small dorsal spot on segment 1; U-shaped mark and, not connected thereto, narrow terminal ring on 2; 3-7 narrow, but successively broader mid-dorsal line, not fully reaching anterior end and slightly enlarged immediately before posterior end of each segment. Segments 8-10 marked black dorsally—8 less, 9 more than posterior half, 10 full length. Appendages (Text-fig. 28) reddish brown. *A*\* slightly proximal to *Cuq*, not fully the length of *Cuq*;

ptero stigma oblong, angles moderately acute; light reddish brown to full red.

♀. Dorsal surface of head light ochreous, turning posteriorly to duller, olivaceous shades; black markings similar to male, but still more reduced. Posterior lobe of prothorax rather broad, erect; styles comparatively short and broad, not quite bent down to the dorsal surface. Thorax light ochreous, turning to still lighter shades laterally and ventrally; black markings as in male, but considerably narrower throughout. Legs light reddish ochreous; femora narrowly and incompletely edged with black on lateral surface. Abdomen comparatively robust, dull ochreous; black markings much reduced. Segments 2-6 with a very narrow, partially interrupted mid-dorsal line and a small round spot near posterior end; 7 complete mid-dorsal band, broader, enlarged near the posterior end; 8 dorsal spot at base, finally united to a narrow terminal ring; 9 complete dorsal band; on the tenth two basal dots. Pterostigma light greyish ochreous.

♂, *Abd.* 30, *hdw.* 19 mm. ♀, 28, 21.

We have examined examples of this species from regions as far remote as Abyssinia and Egypt and found those specimens to agree perfectly with the South African series.

*P. acaciae* and the two species following appear closely allied, though almost certainly distinct. They have in common the red colour dominant on head and at least partially on thorax, and in the male the comparatively short superior appendages of very simple structure.

#### PSEUDAGRION MASSAICUM (Sjöstedt, 1909).

S. Afr. Mus.: 2 ♂, 1 ♀, M'Fongosi, Zululand (v, x. 1911, W. E. Jones). Mus. Brussels, de Selys' Coll.: 1 ♂, Port Natal (very old specimen). Mus. Stockholm: 1 ♀, Caffraria (J. Wahlberg); 1 ♂, Kibonoto, Kilimandjaro (Sjöstedt).

♂. Occiput reddish ochreous in lateral and ventral, black in medial and dorsal half (black reduced to a spot at foramen in specimens from M'Fongosi). Labium reddish ochreous. Dorsal surface of head brick red, marked black (the red colour slightly darker than in *P. acaciae*); small dots at base of labrum and postclypeus; narrow transverse line in front of anterior ocellus; complete, comparatively broad transverse band across posterior ocelli, this band continued to a complete, rather broad outline of the large postocular spots; these spots united by a line at the occipital margin. Prothorax black, sides and three small dorsal spots reddish. Thorax

dark red, or olivaceous red dorsally, shading into yellowish red or dull greenish at the sides, marked black; rather broad line on median suture extended ventrally to join the humeral black stripe; a rather broad stripe on humeral suture shortly enlarged medially on dorsal third, enlarged ventrally to mesepimeron and mesinfraepisternum; lines in dorsal half of first, dorsal third of second lateral suture. Sides posteriorly and ventral side whitish pruinose. Legs black, pruinose, external surface of tibiae and tarsi ochreous. Abdomen comparatively short and robust; dorsum bronzy black, sides olivaceous; olivaceous colour broad to apical sixth of segments 3-7 and forming very narrowly interrupted basal rings; black colour of dorsum widened at apical sixth almost to ventral margin; large U-shaped black spot on dorsum of segment 2, joined to apical black

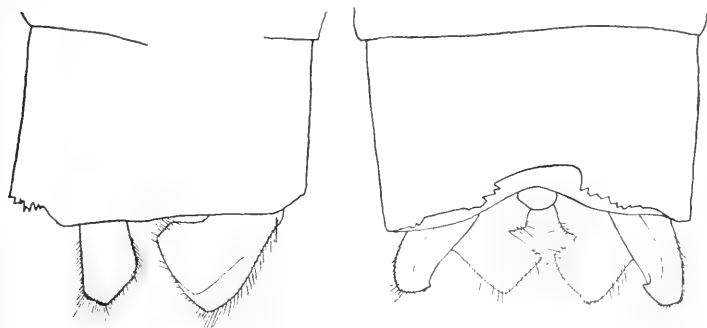


FIG. 29.—*Pseudagrion massaicum*, ♂. Port Natal. (Coll. Selys.)  
Appendages, right side and dorsal view.

ring and sometimes both branches touching anteriorly to include an isolated spot of reddish olivaceous or bluish colour; segments 8-10 dull blue (bright blue in life?). Appendages (Text-fig. 29): The somewhat peculiar shape of inferior appendages is the same in all specimens examined.  $A^*$  proximal to  $Cuq$  by about the length of  $Cuq$ . Pterostigma oblong, angles comparatively acute, reddish brown.

♀. Dorsal surface of head dull reddish ochreous, shading to olivaceous posteriorly. Black markings much reduced; transverse band at posterior ocelli complete, but narrower than in male; post-ocular spots outlined with black at the posterior margin only; black spot at occipital foramen present. Prothorax ochreous, narrowly lined with black in the sutures; posterior lobe comparatively broad, erect; styles obliterated to a merest trace, the lobe being only slightly thickened at the two points where they would have their base. Thorax

light olivaceous, shading to whitish on metepimeron and ventral surface; black markings as in male, but reduced in size.

Legs very light ochreous, femora lined with black laterally, pruinose. Abdomen olivaceous, dorsally bronze black, the black bands being considerably narrower than in the male; on segment 2 a very narrow lanceolate black spot; dorsum of segments 8-9 black, 10 olivaceous. *A*\* proximal to *Cuq* by a little more than the length of *Cuq*; pterostigma ochreous.

♂, *Abd.* 27, *hdw.* 19.5 (Selys), to 31, 21.5 mm., M'Fongosi, Zululand. ♀, 30.5, 22.

This form has been described by Sjöstedt as a subspecies of *P. punctum*, Ramb. (from Mauritius). We have compared one of Sjöstedt's type-specimens and also the mutilated type of *punctum*. De Selys had doubtfully regarded his specimen from Natal as belonging to *punctum*. What remains of the type *punctum* appears different, and at the present state of our knowledge it seems safest to consider *massaicum* as a distinct species.

#### PSEUDAGRION SJÖSTEDTI (Förster, 1906).

Brit. Mus.: 1 ♂, Lualaba River, 2500-4000 ft. (7.v.1907, S. A. Neave); 1 ♂, Edjai, Ashantee, Gold Coast (31.i.1913, Dr. J. J. Simpson). Coll. E. B. Williamson: 4 ♀, Salisbury, Mashonaland (iii.1905, G. A. K. Marshall). Mus. Tervueren: 1 ♂, Katwamba (10.xi.1911, Dr. Bequaert).

♂. Occiput dull greyish ochreous. Labium whitish. Head anteriorly brick-red, and so are the labrum, anteclypeus, postclypeus, genae, frons to somewhat beyond the anterior ocellus, base of antennae and anterior two-thirds of eyes. Posterior part of frons and vertex blackish, a moderately broad border of large, round, reddish or ochreous postocular spots; a yellowish line across the occipital margin. Prothorax black, whitish pruinose, marked red, the sides rather broad; large round dorsolateral spots and a medial line, the posterior lobe erect, narrow, faintly tripartite. Thoracic dorsum red (more dull than frons, but perhaps the shade is the same in the living insect); narrow (Lualaba) or slightly broader (Gold Coast) black line on median suture; black band on humeral suture at dorsal end slightly enlarged medially (Lualaba), or medially and laterally (Gold Coast), very narrow (Lualaba) or but slightly narrower than ante-humeral red stripe (Gold Coast). Sides dull olivaceous, whitish pruinose; metepisternum and a narrow ventral border on metepisternum dull brown (in both specimens, though possibly caused by post-mortem decomposition).

Ventral surface dull reddish ochreous, whitish pruinose. Legs black, external side of tibiae and tarsi broadly and conspicuously yellowish. Abdomen very slender, dorsum bronzy black, bluish pruinose on segment 1, basal half of 2, basal two-thirds of 8 and basal half of 9; narrow, dorsally interrupted terminal rings on segments 1 to 5 reddish ochreous; ventral surface reddish ochreous. Appendages (Text-fig. 30) obscure. *A\** proximal to *Cuq* in hind wing. Wings slightly tinged with yellowish grey; pterostigma reddish, costal-distal angle acute.

♀. Dorsal surface of head olivaceous; black border of postocular spots reduced to narrow and slightly incomplete anterior and posterior lines. Prothorax olivaceous, the impressed lines rather narrowly black; posterior lobe erect, produced in the middle in a nearly semi-circular projection; styles comparatively long, about one-third the

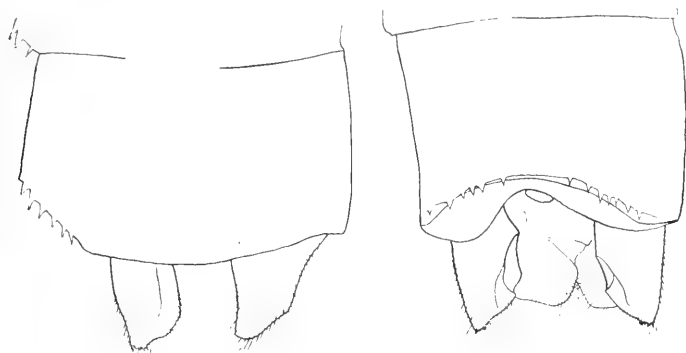


FIG. 30.—*Pseudagrion Sjöstedti*, ♂. Lualaba River. Appendages, right side and dorsal view.

length of prothorax, depressed, narrow, slightly divergent. Thoracic dorsum olivaceous with the merest trace of a reddish shade; narrow black lines on median and humeral sutures, the latter slightly irregular and shortly interrupted near the fourth. Sides and ventral surface dull ochreous; black dots in dorsal end of first and second lateral sutures.

Legs ochreous, lateral surface of femora and internal surface of tibiae edged with black. Abdomen long and slender; ochreous or olivaceous, a black dorsal band of rather broad lanceolate stripes interrupted at anterior ends of segments 3 to 7; terminal dilatations of black on same segments to almost ventral margin; 8 black on dorsum, 9 with a broad basal triangular black spot, 10 olivaceous. Wings as in male, pterostigma greyish ochreous.

♂, *Abd.* 35, *hdw.* 22.5 mm. (Lualaba). ♀, 32, 21 (Gold Coast).

The males agree well with Förster's description of that sex; the association of Mr. Marshall's females with them is not quite certain, but it may claim a good deal of probability. The colour system, stature and condition of *A\** and *Cuq* is very much the same; the difference between these females and the same sex of *acaciae* and *massaicum* lies in the size and especially in the well-developed prothoracic styles. They are to some degree similar to *practextatum* and *salisburyense*, though distinct by the reduction of black lines on the thoracic dorsum, which reduction goes beyond what may reasonably be expected even in extreme specimens of those darker species.

#### CERIAGRION (Selys, 1876).

This genus embraces a small number of species inhabiting the tropical part of the Old World. They are common and widely distributed in low levels and coast districts, and consequently have been described comparatively early (*glabrum*, *coromandelianum*, *erubescens*, *cerinorubellum*). Recently additional species have been found in tropical Asia and especially Africa, which there is evidence to suppose is the centre of the genus. One species is found within our faunal limits in almost universal distribution; a second one, from Katanga, may be advantageously described here, as its occurrence in Rhodesia is probable.

1. Wings of adult male decidedly yellow, of female variable from hyaline to greyish yellow. Abdomen of male bright orange, of female dull greyish ochreous. Caudal end of tenth segment in male with a regularly arched excision; the lateral edges of this excision projecting as blackish, denticulate tubercles. The superior appendages distinctly shorter than the inferior . . . . . *C. glabrum*.
2. Wings of adult male very light yellowish grey, of female almost hyaline. Abdomen of male pinkish ochreous dorsally, turning to whitish ochreous at the sides. Caudal end of tenth segment in male with a similar excision, but the lateral tubercles absent. Superior appendages as long, or very slightly longer than the inferior. Abdomen comparatively longer and narrower than in *glabrum* . . . . . *C. suave*.

#### CERIAGRION GLABRUM (Burmeister, 1839).

S. Afr. Mus.: 1 ♂, Blue Cliff, Dunbrody (ii. 1912); 1 ♀, Barberton, Transvaal; 6 ♂, 5 ♀, M'Fongosi, Zululand (iii, iv, v. 1911, Jones); 9 ♂, 5 ♀, Lorenzo Marques (24, 25. ix, 22. x, 1, 5. xii. 1911); 1 ♀, Bulawayo (21. iii. 1912). Coll. E. B. Williamson: 9 ♂, Natal (G. F. Leigh); 5 ♂, 1 ♀, Princetown, Natal (8, 18. xii. 1908; 18, 22. ii. 1909, *id.*); 2 ♂, 1 ♀, woodside off Umbila Road, Congella, near Durban, Natal (20. x. 1904, 29. iii. 1905, *id.*); 1 ♂, Hilton Road, 3500 ft.,



Natal (21 . xii . 1909, *id.*) ; 2 ♂, 2 ♀, Salisbury, Mashonaland, 5000 ft. (10 . i . 1900, G. A. K. Marshall). Mus. Stockholm : 2 ♂, Cap. Bon. Spei (Victoria) ; 1 ♂, Caffraria (Wahlberg) ; 1 ♂, 1 ♀, Natal (Tragardh) ; 1 ♂, Mashonaland (Marshall). Mus. Hamburg : 2 ♂, Lorenzo Marques (17 . ix . 1911, Michaelsen) ; 3 ♂, Beira (22 . ix . 1911, *id.*) ; 1 ♂, Grootfontein, South-West Africa (7-11 . vi . 1911, *id.*). Coll. Ris : 3 ♀, Rikatla, near Lorenzo Marques (i . 1914, Junod). Coll. K. J. Morton : 1 ♂, Macequece (19 . ix . 1908, Miss Fountaine).

This common species is known from all parts of the African continent south of the desert belt, also from the Seychelles and Madagascar.

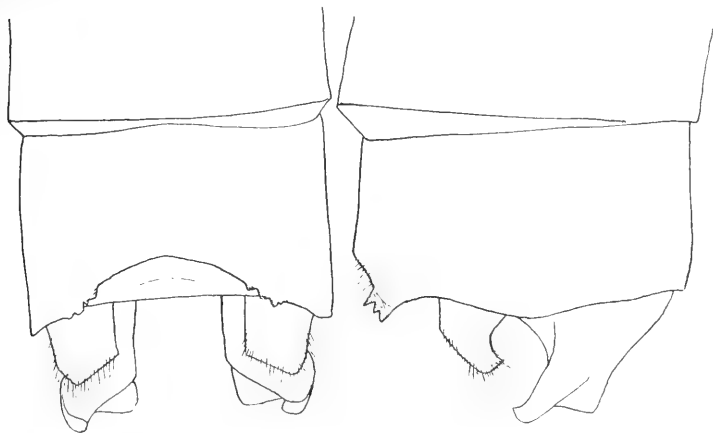


FIG. 31.—*Ceriagrion glabrum*, ♂. Lorenzo Marques. Appendages, right side and dorsal view.

♂. Occiput whitish ochreous ; labium light yellow. Labrum, anteclypeus, postclypeus and vertical part of frons bright ochreous yellow ; genae lemon-yellow. Vertex and dorsal surface of frons ferruginous, gradually turning to yellowish anteriorly. Thoracic dorsum ferruginous, sides yellow, turning gradually to whitish on ventral surface ; a mere trace of blackish dots in the dorsal end of humeral and second lateral sutures. Legs yellow with black spines. Abdomen bright orange red, turning to yellowish ventrally. Tenth segment and appendages (see Text-fig. 31). Wings conspicuously yellow ; pterostigma very light yellowish grey.

Immature specimens do not show the yellow tinge of wings ; and the bright orange, ferruginous and yellow colours of the adult stage are gradually developed from dull ochreous shades.

♀. Occiput and labium whitish. Labrum, anteclypeus, genae and vertical part of frons whitish. Postclypeus, frons superiorly and vertex dull ferruginous brown. Thoracic dorsum olivaceous, turning to whitish on the sides and ventral surface. Legs whitish ochreous with black spines. Abdomen olivaceous, turning to whitish ochreous ventrally. Colour of wing membrane less intense than in male and of a greyish rather than pure yellowish shade.

Size variable, independently of origin. ♂, *Abd.* 29, *hdw.* 19 to 33, *pt.* 2.2 mm. ♀, 30, 20.5 to 35, 2.3.

*CERIAGRION SUAVE*, n. sp.

Mus. Tervueren: 4 ♂, Kapiri, Katanga (x. 1912, Legros).

♂ (adult). Occiput and labium whitish. Labrum light yellow, genae and vertical face of frons greenish white; anteclypeus, post-

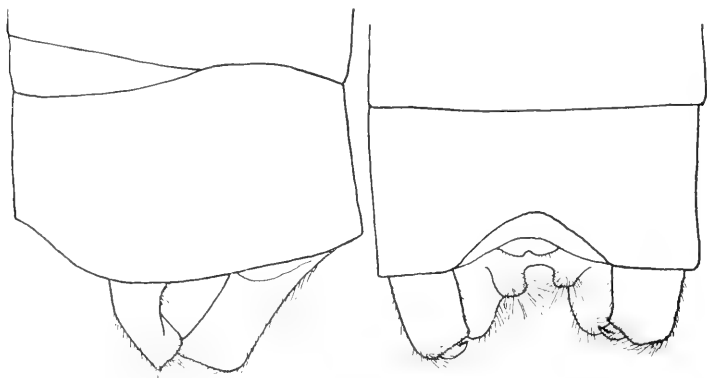


FIG. 32.—*Ceriagrion suave*, ♂. Kapiri. Appendages, right side and dorsal view.

clypeus, frons and vertex superiorly light ferruginous. Thoracic dorsum ochreous brown, turning gradually to very pale ochreous on the sides, to whitish on ventral surface. Legs whitish ochreous with black spines. Abdomen very long and slender; dorsum pale ochreous with a pinkish shade, turning to very pale ochreous on the sides. Tenth segment and appendages (see Text-fig. 32). Wings very slightly tinged with greyish, pterostigma very pale ochreous with a pinkish shade.

*Abd.* 36, *hdw.* 22.5 mm.

Besides the marked structural differences in the tenth segment and appendages, this species differs from *C. glabrum* by its much more slender build, head, thorax and abdomen being conspicuously narrower,

the latter also relatively longer. The colours are rather conspicuously different from fully coloured, much less so from immature *glabrum*. The female remains unknown. We must expect to find it difficult of identification from the female of *glabrum*.

### ENALLAGMA (Sclys, 1876).

This genus is chiefly North American; it is represented in Europe by a single species, in Africa by a group of closely allied forms which are very imperfectly known.

No sufficient reason can be found for separating this African group generically from the main body of the genus, although geographical reasons might suggest such a separation. Two species not yet known from within the limits of the present fauna are described here, as it was found desirable to take notice of all the species known to the writer from continental Africa.

#### Table of Males.

1. Dorsum of tenth segment somewhat abruptly elevated in the middle, the projection divided by a narrow excision in two small rounded lobes. Superior appendages directed caudad, with no medial ventral projection, somewhat furcate in side view; conspicuously longer than the inferior.
  2. Dorsum of tenth segment gradually (if at all) elevated in the middle with a narrow triangular or broadly arched excision, not distinctly bilobed. Superior appendages, see under 3 and 4 . . . . . 3.
2. Two elevated, almost circular lobes at the ventral end of median thoracic suture. Pterostigma conspicuously longer than broad; wings narrower than in following species . . . . . *E. subfurcatum*.  
 No elevated lobes at the median thoracic suture. Pterostigma very little longer than broad, wings comparatively broader than in *subfurcatum* (and other species here described) . . . . . *E. rotundipenne*.
3. *Cuq* nearer the level of first than of second *Anq*. Superior appendages shorter than tenth segment, directed caudad and very slightly ventral, obtuse; tenth segment very broadly and shallowly excised. Dorsum of thorax and abdomen chiefly black . . . . . *E. nigridorsum*  
*Cuq* at equal distance from first and second *Anq* or nearer second . . . . . 4.
4. Superior appendages directed caudad, roughly triangular in dorsal view, their medial border projecting ventrad nearly as long as tenth segment.
  5. Superior appendages bent strongly ventrad, at least in their basal half; no distinct medial ventral dilatation . . . . . 8.
5. Pale colours light ochreous, bluish only on terminal segments. Pterostigma and appendages very light yellowish . . . . . *E. subtile*.  
 Pale colours blue. Pterostigma greyish ochreous to black. Appendages blue and black to almost black . . . . . 6.

6. Very slender and elongate form (*abd.* 26, *hdw.* 19.5 mm.). No blue line on median thoracic suture. Pale colours very pure sky blue, yellowish on sides of segments 3-6.  
*A\** proximal to *Cuq* by the length of *Cuq* or less . . . . . *E. elongatum*.  
 Form less elongate (*abd.* 20, *hdw.* 13.5 to 24.5, *pt.* 1.7). A blue line on median thoracic suture. Blue colour with a slight greenish shade. *A\** proximal to *Cuq* by more than the length of *Cuq* . . . . . 7.
7. Postocular spots comparatively small, united by a narrow blue line on occipital border, bordered with black posteriorly. Superior appendages chiefly black . . . . . *E. glaucum*.  
 Postocular spots very large, not bordered with black posteriorly, thus confluent to bluish colour of occiput. Superior appendages chiefly blue. Black colour on thorax and abdomen much reduced compared to *E. glaucum* . . . . . *E. schultzei*.
8. Superior appendages broken on side view, the basal part spinulose, directed ventrad, the apical part directed caudad, obtuse. Dorsal spine of inferior appendages comparatively long and slender. Smaller than following species . . . . . *E. fractum*.  
 Superior appendages bent ventrad for their entire length, almost straight on side view, distinctly sinuate in dorsal view. Dorsal spine of inferior appendages short.  
 Larger than preceding species . . . . . *E. sinuatum*.

### Table of Females.

(No females of *Schultzei* are known.)

1. Black lines on legs, at least on first femora and tibiae. A black line on humeral suture (both comparatively narrower than in corresponding males) . . . . . 2.  
 No black lines on legs, a very narrow one or none at all on humeral suture . . . . . 5.
2. *Cuq* nearer to first than second *Ang*. Green or bluish ante-humeral line very little broader than in corresponding male, narrower than humeral black stripe. Hind lobe of prothorax very narrow, almost straight, very slightly convex in the middle . . . . . *E. nigradorsum*.  
*Cuq* at equal distance from first and second *Ang*, or nearer second. Green or bluish ante-humeral line broader than in corresponding male by the reduction of humeral black stripe . . . . . 3.
3. Posterior lobe of prothorax regularly convex or projecting in a very low triangle . . . . . 4.  
 Posterior lobe of prothorax raised in the middle in a trapezoid projection, which is regularly and shallowly concave at the posterior free margin. Wings comparatively broad; pterostigma very little longer than broad . . . . . *E. rotundipenne*.
4. Posterior lobe of prothorax very narrow, its median third projecting as a very low and obtuse triangle. Slightly larger and more robust than the following species . . . . . *E. subfurcatum*.  
 Posterior lobe of prothorax broader, regularly convex, sometimes with an indication of a median tubercle . . . . . *E. glaucum*.

5. Thoracic dorsum each side with a blackish band along the median ochreous line; each black band about as broad as the ochreous ante-humeral stripe of the mesepisternum. Pterostigma greyish ochreous . . . 6.  
Dark bands of thoracic dorsum golden brown, only centrally darkened to a narrow blackish line. Pterostigma pale yellow. Posterior lobe of prothorax comparatively broad, regularly convex, slightly depressed in the middle . . . . . *E. subtile*.

6. Smaller species. 1 *abd.* 26, *hdw.* 19 mm. Hind lobe of prothorax comparatively broad, regularly convex, slightly depressed ventrad in the middle.

*E. fractum*.

Larger species. *Abd.* 28.5, *hdw.* 20 to 30, *pt.* 2.1 mm. . . . . 7.

7. Hind lobe of prothorax moderately broad, almost regularly convex at free margin, very slightly depressed in middle. Dorsal black band of abdomen very narrow, light colour of sides largely visible in a dorsal view.

*E. sinuatum*.

Hind lobe of prothorax narrow at the sides, broader in medial third, where it is depressed and dorsally concave. Dorsal black band of abdomen broad, light colour of sides not visible in a dorsal view.

*E. elongatum*.

#### ENALLAGMA SUBFURCATUM (Sélys, 1876).

Coll. E. B. Williamson: 1 ♂, Salisbury, Mashonaland (iv. 1905, G. A. K. Marshall). Coll. Ris: 1 ♂, 1 ♀, Eritrea (Kristensen); 3 ♂, 8 ♀, Harrar, Abyssinia (*id*).

♂. Occiput light blue, rather broadly bordered with black at the foramen. Labium whitish. Dorsal surface of head light blue, marked with black; narrow line at base of labrum; postclypeus entirely black; vertex from the base of antennae backward, interrupted by cuneiform postocular spots and a narrow line on the occipital margin, which are blue. Prothorax black, marked with blue; narrow line on anterior margin interrupted in the middle, lateral borders and small dorsolateral triangular spots. Posterior lobe black, narrow, erect, in a low arc, from the vertex of which a small bluish point projects horizontally backward. Thoracic dorsum black; complete, straight, blue ante-humeral lines, distant slightly more than their own breadth from humeral suture. Humeral black colour extending laterally to about half-way between humeral suture and the stigma, somewhat irregular in posterior outline; projecting posteriorly at the ventral end, a narrow blue stripe cutting into the dorsal end obliquely towards the humeral suture. Sides otherwise blue; a black dot in dorsal end of second lateral suture. Ventral side blue. Legs greyish blue; external side of femora and tibiae broadly black; tarsi ochreous, obscure at the joints.

Abdomen moderately stout; segments 1 to middle of 3 and 8 to 10 blue, middle of 3 to 7 dull yellowish or light olivaceous, marked

with black. Segment 1 transversely oblong basal spot over one half of the length; 2 complete dorsal longitudinal band, dilated at anterior end and still more near posterior end, this dilatation immediately followed by a contraction and then by a narrow complete posterior ring; 3-7 broad dorsal longitudinal band, not fully interrupted by very narrow, dorsally incomplete basal rings, very slightly enlarged near the posterior end of 3-6 (the band as a whole being too broad to make these usual dilatations conspicuous); 8-9 entirely blue, exceptionally a terminal dorsal black dot on 9; 10 broadly black on dorsum. Appendages (Text-fig. 33) black, tips of superior yellowish.

Wings hyaline, slightly tinged with greyish in adults. Pterostigma black, very narrowly bordered with whitish.

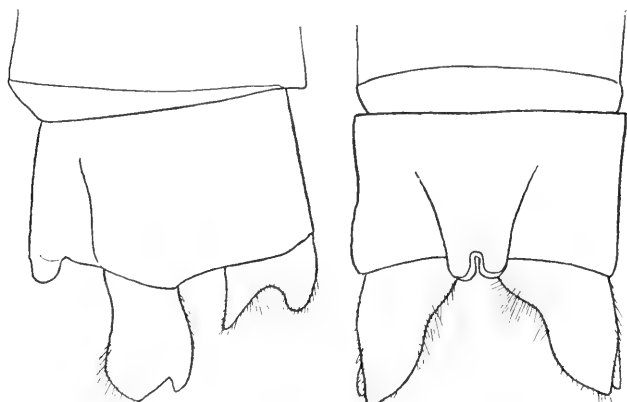


FIG. 33.—*Enallagma subfurcatum*, ♂. Harrar. Appendages, right side and dorsal view.

♀. Light ochreous, to olivaceous and greenish blue according to maturity. Dark colour at occipital foramen lighter and more diffuse. Postocular spots larger, lined posteriorly only by a narrow line of blackish or altogether fused to light colour of occiput; line on occipital border rather broad. Ante-humeral stripes considerably broader, their lateral margin approaching very closely the humeral suture. Humeral black limited to a narrow line at the suture; black dots in dorsal end of first and second lateral sutures. Black lines on legs much narrower, interrupted at third femora and tibiae. Abdomen much stouter than in male, dorsal black band comparatively narrower, otherwise much the same. Strong vulvar spine, vulva to end of abdomen. Pterostigma larger than in male, rather light greyish ochreous.

♂, Abd. 24.5, hdw. 17 to 25, pt. 1.8 mm. ♀, 24, 19.

The position of  $M_2$  and  $M_{1a}$  relatively to post-nodal cross-veins shows considerable variability, the extremes of the series being  $\frac{5+2}{4+2} \cdot \frac{5+2}{4+3}$  and  $\frac{6+3}{5+3} \cdot \frac{6+3}{5+3}$ , the most regular position apparently being  $\frac{5+3}{4+3} \cdot \frac{5+3}{4+3}$ .

ENALLAGMA ROTUNDIPENNE, n. sp.

Mus. Stockholm: 1 ♂, Caffraria (Wahlberg). S. Afr. Mus.: 1 ♀ not dated, but most probably from M'Fongosi, Zululand.

These two specimens belong most probably to the same species—a form not otherwise represented in the material examined. They are similar in stature and in colour scheme to *E. nigridorsum*, but the appendages are rather widely different, and both sexes are distinct by their wings broadly rounded apically, the pterostigma being dilated accordingly in the antero-posterior dimension. *Cuq* half-way between first and second *Anq* or slightly more distally.  $A^*$  proximal to *Cuq* by almost twice the length of *Cuq*. Arculus very slightly distal to second *Anq*;  $M_2$  and  $M_{1a}$   $\frac{5+3}{4+3} \cdot \frac{5+2}{4+3}$  in ♂,  $\frac{5+3}{4+3} \cdot \frac{5+3}{4+3}$  in ♀.

♂. Occiput light blue, black spots at the foramen. Labium whitish. Dorsal surface of head, a rather broad line at base of labrum, postclypeus entirely, frons and vertex to half-way between anterior ocellus and postclypeus light blue marked with black; blue postocular spots narrow, cuneiform, no blue line on occipital border.

(Prothorax damaged.) Thoracic dorsum black; complete, narrow, blue ante-humeral lines, less than one-half the breadth of median black of corresponding side. Humeral black posteriorly to first lateral suture in dorsal third slightly less ventrally; black dot in dorsal end of second lateral suture. Sides otherwise blue, ventral side whitish. Legs very light greenish; femora broadly, tibiae narrowly lined with black externally.

Abdomen segments 1 to middle of 3, 8 to 10 blue, middle of 3 to 7 yellowish, marked with black; very broad dorsal band (almost as in *nigridorsum*), very narrow, dorsally interrupted light basal rings on 3 to 6; 8 entirely blue; 9 terminal transverse black spots; dorsum of 10 broadly black. Appendages (Text-fig. 34).

Pterostigma grey, rather broadly bordered with blackish, slightly larger and darker in front than in hind wing.

♀. Sides of prothorax greenish blue, dorsum black with two large dorsal posterior bluish spots and the anterior margin broadly blue. Posterior lobe erect to an angle of about 60°, narrow, trapezoid, the

free margin regularly and shallowly concave, the centre of the excavation thickened into an antero-posterior direction by a kind of bridge towards the margin of the median lobe, the thickening projecting as a small blunt point horizontally backward; this small bridge and projection ochreous, the margin otherwise black.

Colour of head, thorax, base and end of abdomen light greenish blue (instead of pure blue in male). Postocular spots larger, bordered only by a narrow black line posteriorly and united by a narrow line over the occipital border. Very narrow greenish line over median thoracic suture; ante-humeral lines broader, about as broad as humeral black colour, which projects very little posteriorly beyond the suture. Small black dots in dorsal end of first and second lateral sutures. Black lines of legs much narrower, interrupted on third

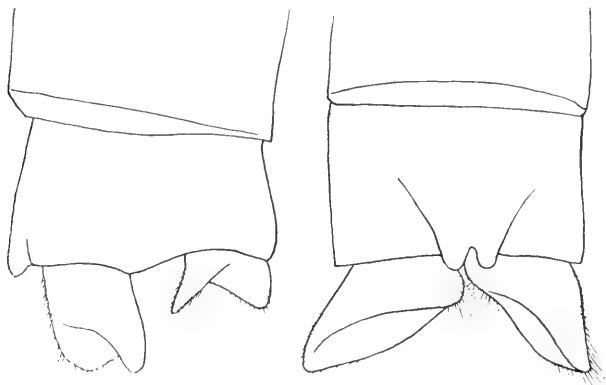


FIG. 34.—*Enallagma rotundipenne*, ♂. Caffraria. Appendages, right side and dorsal view.

femora and tibiae. Abdomen segments 1-7 as in male, but the dorsal black band comparatively narrower on the stouter abdomen; segment 8 blue in anterior half, black in posterior half and a very narrow transverse line on anterior margin; broad and complete dorsal black band on 9-10. Pterostigma very light, greyish ochreous, broadly lined with whitish.

♂, *Abd.* 19.5, *hdw.* 13.5 mm. ♀, 19.5, 14, *pt.* 3.5.

#### ENALLAGMA NIGRIDORSUM (Selys, 1876).

S. Afr. Mus.: 1 ♂, Lorenzo Marques (24. ix. 1911). Coll. Ris: 3 ♂, 3 ♀, Delagoa Bay (1892, H. Junod); 1 ♂, Lorenzo Marques (25. ix. 1911).

♂. Occiput light bluish grey. Labium whitish. Dorsal surface of head greenish blue, marked with black, also postclypeus from base



of antennae backward; very narrow cuneiform blue postocular spots united by a narrow blue line on occipital margin. Prothorax black, sides narrowly blue, posterior lobe very narrowly bordered with blue.

Thoracic dorsum black; rather broad, blue ante-humeral stripes, nearer the humeral than the median suture, about as broad as the median black band of same side. Humeral black extending laterally to be divided about equally by the humeral suture. Sides otherwise light blue; a small black dot in dorsal end of second lateral suture. Ventral side whitish. Legs greyish blue; external side of femora broadly, of tibiae narrowly black.

Abdomen almost pure light blue, with a very slight greenish shade, marked with black; quadrangular spot over the entire length of segment 1; segment 2 with a complete broad dorsal band, slightly

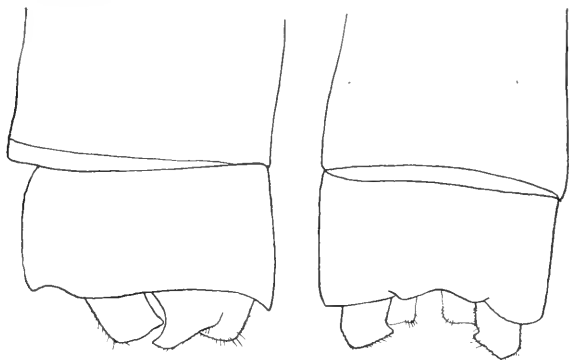


FIG. 35.—*Enallagma nigridorsum*, ♂. Lorenzo Marques. Appendages, right side and dorsal view.

contracted towards the middle, contracted at the end, where it joins a narrow terminal black ring; 3-6 broad dorsal band very narrowly interrupted at base and enlarged at end of each segment; 7 black except narrow lateral stripes and a very narrow basal ring; 8 blue, a black spot on anterior half of dorsum; 9 entirely blue; 10 blue with dorsal black band. Appendages (Text-fig. 35) superior black, inferior black in lateral, ochreous in median half.

Pterostigma greyish, finely margined with whitish.  $M_2$  and  $M_{1a}$   
 $\frac{5+2}{4+3} \cdot \frac{5+3}{4+3}$  Abd. 21, hdw. 14 mm.

♀. The females are not in sufficiently good condition for description.

From Madagascar there are in the writer's collection 3 ♂, 2 ♀, given him years ago by M. R. Martin. These specimens differ somewhat

from the continental type, and might eventually be described as a distinct subspecies or even species.

♂. Different from the above-described specimen by—(1) ante-humeral blue stripes very narrow, invaded by the median black stripe, distant about their own breadth from humeral suture; (2) black dorsal band on segment 8 for about two-thirds the length, black dorsal spot on anterior half of segment 9, dorsal black band of segment 10 broader; (3) appendages slightly different, the medial prominence of superior being more distinct and a latero-ventral projection visible in side view (Text-fig. 36).  $M_2$  and  $M_{1a}$   $\frac{5+2}{4+3} \cdot \frac{5+2}{4+3}$ ,  $\frac{5+3}{4+3} \cdot \frac{5+2}{4+3}$ ,  $\frac{5+3}{4+4} \cdot \frac{5+3}{4+3}$ .

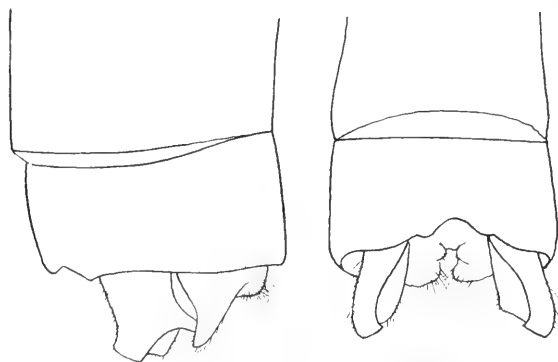


FIG. 36.—*Enallagma nigradorsum*, forma b, ♂. Madagascar. Appendages, right side and dorsal view.

♀. Head and thorax as in male; light colour of head dull ochreous; postocular spots bluish green; ante-humeral stripes ochreous; sides of thorax whitish. Abdomen as in male, but instead blue olivaceous on segments 1–2, ochreous 3–7, bluish green 8–10; dorsum of 8 wholly black; 9 black except a narrow terminal ring; 10 with narrow dorsal transverse black line. Strong vulvar spine.

Pterostigma very light greenish ochreous.  $M_2$  and  $M_{1a}$   $\frac{5+3}{4+3} \cdot \frac{5+3}{4+3}$  in both specimens. *Abd.* 20, *hdw.* 14 mm.

#### ENALLAGMA ELONGATUM (R. Martin, 1906).

S. Afr. Mus.: 4 ♂, Eldoret, Brit. East Africa (viii. 1913, W. E. Fry). Mus. Stockholm: 1 ♀, Kilimandjaro (29. iii. 1906, Y. Sjöstedt).

From Sjöstedt's description it seems most probable that these

specimens belong to what this author and originally R. Martin described as *Ischnura elongata*. This supposition is made, although Prof. Sjöstedt sent the female under another name. This female is here associated with the males chiefly according to its elongate stature and also as coming from the same geographical region (outside our faunal district!). The species is evidently not an *Ischnura*, but clearly an *Enallagma* of the African group.

♂. Occiput light greyish blue. Labium whitish. Labrum blue, very narrowly obscure at base; anteclypeus blue; postclypeus black; frons and vertex blue to base of antennae, black posteriorly; rather large cuneiform postocular spots and a narrow line on occipital margin blue. First joint of antennae blue, the rest black. Prothorax black, marked blue; the sides broadly so, lateral cuneiform, and a small median posterior spot. Posterior lobe moderately high, erect to an angle of about  $60^\circ$ , shallowly trilobate, the median lobe much the broader, its free margin very slightly and regularly convex. Thoracic dorsum black; broad blue ante-humeral stripes, about as broad as the corresponding half of median black stripe, slightly narrowed dorsally. In some of the specimens only a very narrow whitish line on median suture, humeral black about as broad as blue ante-humeral stripe, divided about equally by dorsal end of humeral suture just touching the suture at ventral end. Sides blue; black dot in dorsal end of second lateral suture. Ventral side light bluish grey. Legs bluish grey, femora and tibiae broadly black anteriorly.

Abdomen comparatively long and slender. Segment 1 blue with dorsal black spot; 2 blue, a posterior transverse black band, slightly convex anteriorly to one-half the segment's length, straight behind and distant there about by one-half its own breadth from the segment's end, sides broadly blue over the entire length, a very narrow black ring on joint; sides of 3 blue in anterior third, yellowish in the posterior two-thirds of length, dorsum black, the broad band narrowed to a point in first fifth, broadened to lateral margin in last fifth; 4-6 light yellowish on sides, black dorsally, and to lateral margin in last fifth, interrupted by a very narrow bluish ring at anterior joint. 7 black, merest trace of a yellow line at lateral margin and very narrow anterior and posterior blue rings; 8-9 blue; 10 black on dorsum and in a narrow anterior ring, blue laterally, yellowish ventrally.

Appendages (Text-fig. 37) blackish, lighter on ventral side.

Pterostigma very dark reddish brown to blackish.  $A^*$  proximal to  $Cu_1$  by the length of that vein or slightly more.  $M_2$  at sixth, exceptionally fifth  $Pnq$  in front wing, fifth  $Pnq$  in hind wing;  $M_1a$  3 or 4 veins more distally. *Abd.* 26, *hdw.* 19.5 mm.

♀. Occiput and labium light ochreous. Labrum olivaceous, narrowly bordered with ochreous. Base of mandibles and genae light yellowish olivaceous. Anteclypeus, postclypeus, frons and vertex dull olivaceous except a transverse blackish band across the ocelli; postocular spots not divided from the light colour of occiput.

Prothorax dull yellowish green, narrow black lines in the sutures. Posterior lobe less distinctly trilobate than in male, medial higher third slightly depressed and dorsally concave. Thoracic dorsum mostly olivaceous; median suture lined with ferruginous, then a black stripe of about one-third the breadth of each mesepisternum and a very narrow black line in humeral suture. Sides olivaceous, shading into ochreous behind and ventrally; black dot in dorsal end

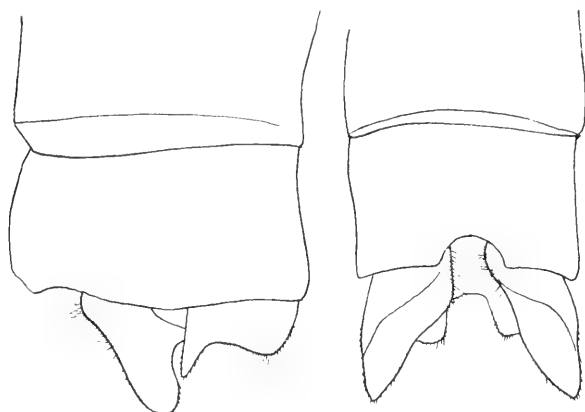


FIG. 37.—*Enallagma elongatum*, ♂. Eldoret. Appendages, right side and dorsal view.

of second lateral suture. Legs ochreous, black dots at distal end of femora and only traces of very narrow and interrupted lateral dark lines on tibiae. Abdomen light olivaceous green on sides, black on dorsum; the light colour of sides cutting into the black of dorsum before the end of segments 2-7; 8 with complete dorsal black band about one-third the segment's breadth; 9 dull olivaceous with two dorsal narrow cuneiform black stripes; 10 and appendages olivaceous.

Pterostigma light greyish brown; venation partly ochreous.  $M_2$  and  $M_{1a}$   $5\frac{1}{2} + 4$  .  $5\frac{1}{2} + 4$  . Abd. 28.5, *hdw.* 20 mm.

#### ENALLAGMA GLAUCUM (Burmeister, 1839).

S. Afr. Mus.: 8 ♂, 1 ♀, King Williamstown, Cape Colony; 1 ♂, Barberton, Transvaal; 10 ♂, 2 ♀, 1 ♂ ♀ *in cop.*, M'Fongosi, Zululand

(iii, iv, v, ix . 1911, W. E. Jones); 3 ♂, Rietfontein (2, 9, 30 . x. 1904); 1 ♂, Salisbury (26 . xii. 1911); 1 ♂, 1 ♀, Matopo Dam, Bulawayo (11 . ii. 1911); Otjituo, S.W. Protectorate (Tucker). Brit. Mus.: 1 ♂, 1 ♀, Deelfontein (Col. Sloggett, 1903); 1 ♂, Kroonstad, Orange Free State (E. Eckersley, 1904); 1 ♂, Boksburg, Johannesburg (C. H. Peard, 1907); 1 ♂, Salisbury, Mashonaland (xi. 1905, G. A. K. Marshall). Mus. Stockholm: 6 ♂, 6 ♀, Cap. Bon. Spei (Victoria); 1 ♂, Port Elizabeth (Dubon); 1 ♀, Caffraria (Wahlberg); 2 ♂, 1 ♀ Swakop., S. West Protect. (Wahlberg); 2 ♂, Salisbury (x, xi. 1903, Marshall). Mus. Hamburg: 3 ♂, 1 ♀, Grootfontein, South-West Africa (7, 11 . vi. 1911, Michaelsen). Mus. Tervueren; 1 ♂, Kapiri, Katanga (x. 1913, Legros). Coll. E. B. Williamson: 4 ♂, 2 ♀, Natal (G. F. Leigh).

This is evidently the most common of the smaller *Agrionidae* throughout the faunal region here discussed. There is some variation in the relative extent of light blue and black colour, but no serious difficulty was found in separating specimens from the allied species, males especially being readily identified by the shape of the appendages. The following description is taken from specimens from M'Fongosi.

♂. Occiput very light greenish blue. Labium whitish or yellowish. Dorsal surface light greenish blue, marked black, also the postclypeus, frons and vertex to base of antennae or slightly more in front; blue postocular spots more variable in size and shape than usually in this genus; mostly narrow, transverse, slightly cuneiform stripes, united by a line on the occipital border, or much broader, separated only by a narrow black line from the occipital blue; or almost circular lateral small spots, which may be exceedingly small, or even disappear almost completely.

Prothorax blue and black, also variable; blue at the sides and a narrow anterior border only, or also a double dorsal spot and the border of the posterior lobe. Thorax light blue and black, also considerably variable. Dark specimens: Dorsum black, blue ante-humeral band slightly narrower than corresponding half of mid-dorsal black stripe; humeral black about equally broad, more so behind humeral suture at ventral end, before at dorsal end; sides light greenish blue, very small black dot in dorsal end of second lateral suture; ventral side turning to whitish. Light specimens: Complete blue line on mid-dorsal suture; ante-humeral blue stripe broader than median black stripe of same side, a narrow black line only on humeral suture. Legs greenish, external side of femora broadly, of tibiae narrowly black.

Abdomen light greenish blue, marked black; quadrilateral dorsal

black spot on segment 1; 2 complete dorsal band, slightly enlarged before posterior end, then narrowed and joined to a very narrow terminal black ring; 3-6 a terminal almost circular spot narrowed to a dorsal stripe which joins the anterior end in a point; 7 black, sides very narrowly blue; 8-9 blue; 10 narrow mid-dorsal black stripe. Appendages (Text-fig. 38), superior black externally, blue internally; inferior variable from light blue to almost black. The relative extent of black and blue colours on abdomen varies in correlation to thorax and head, but remains the same in principle.

Pterostigma black, very narrowly bordered with whitish.

♀. Yellowish ochreous to light olivaceous and black. Markings on head and thorax much as in the lighter forms of male; postclypeus

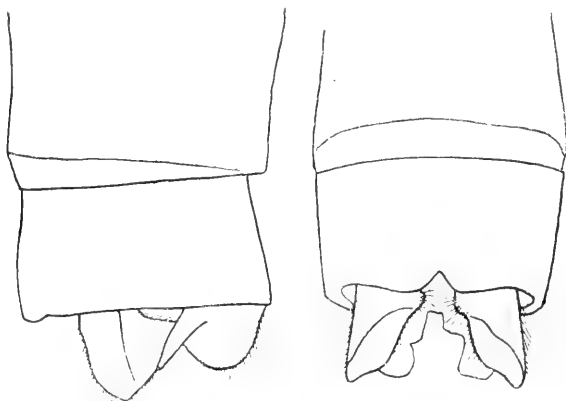


FIG. 38.—*Enallagma glaucum*, ♂. M'Fongosi. Appendages, right side and dorsal view.

rather broadly bordered with ochreous; postocular spots as where they are largest in male. Black lines of legs much reduced, partly incomplete and paler. Abdomen segments 1 and 2 as in male; 3-7 as in dark forms of male, but dorsal black band not pointed anteriorly, only partially interrupted by a very narrow basal ring; black dorsal band also over segments 7-9 and basal half of 10, or only a small basal triangular black spot on 10. Vulvar spine long, vulva to end of abdomen.

Pterostigma conspicuously larger than in male, light ochreous.

♂, *Abd.* 20, *hdw.* 13.5 to 24.5, *pt.* 1.7 mm. ♀, 23, 16.5 to 25, 1.8.

*A*\* proximal to *Cuq* by considerably more than the length of that vein. Position of *M*<sub>2</sub> and *M*<sub>1a</sub> mostly  $\frac{5+3}{4+3}$ .

*E. obliteratum*, which is represented by the single type described by

de Selys, was carefully compared with our series of *E. glaucum*. It was found to agree in all respects, except that the postocular spots are entirely absent (and appear to be so originally, not only by post-mortem discoloration). But clearly this is only the extreme grade of the variation as described above from our specimens of *glaucum*, and *obliteratum* must be considered as a variety not deserving of a name.

ENALLAGMA SCHULTZEI (Ris, 1908).

No other specimen of this form has come to hand, so it stands based on the unique type. When the description was published only a very limited number of specimens of *E. glaucum* were available for comparison. It is obvious that the differences from *glaucum* (see p. 318) may only represent an extreme degree of reduction of black and invasion of light blue elements. Although I believe that the species stands as a doubtful one, further discoveries will settle the question.

ENALLAGMA FRACTUM, n. sp.

Mus. Tervueren: 4 ♂, 2 ♀, Kapiri, Katanga (ix. 1912, Legros). Coll. E. B. Williamson: 4 ♂, 1 ♂ ♀ *in cop.*, Salisbury, Mashonaland (ii. 1900, G. A. K. Marshall); 1 ♂, *ibid.* (v. 1905, *id.*).

♂. Occiput very light bluish grey. Labium whitish. Dorsal surface of head greenish blue; a black transverse band from slightly behind the base of antennae to somewhat beyond the posterior ocelli; a narrow line on occipital margin and large postocular spots remaining blue; the latter confluent with light colour on occiput. Prothorax greenish blue, narrowly black in mid-dorsal line. Thoracic dorsum greenish blue and black; narrow blue line on median suture; black band something less than one-half the breadth of mesepisternum, otherwise blue with a narrow black line and a somewhat stronger dot in the dorsal end of humeral suture. Sides very light greenish blue; very small blackish dot in dorsal end of second lateral suture. Ventral side whitish; indication of partially interrupted blackish lines on external side of femora and tibiae.

Abdomen very slender; very light blue shading to greenish-marked black. Segment 1 black spot at base of dorsum; 2 lanceolate black spot, joined to a very narrow terminal ring by a fine line, reaching the anterior end in a fine point (slightly dilated at anterior end in part of the specimen); 3-6 narrow terminal ring, joined to a dorsal spot which, rounded at the posterior end, abruptly contracts to a line and remains slightly short of the anterior end; 7 an analogous marking at the posterior end running into a black

mid-dorsal stripe of one-third the segment's breadth; 8-9 blue; 10 black mid-dorsal band. Appendages obscure (Text-fig. 39 and p. 318).

Wings slightly yellowish; venation obscure. Pterostigma rather dark greyish brown, narrowly lined with whitish.  $M_2$  and  $M_{1a}$  at  $Puq$  5 + 3 in front wing, 4 + 3 in hind wing.

♀. Head and thorax scarcely different from ♂ in pattern. Colour light olivaceous, turning to bluish at the postocular spots, to reddish brown at thoracic dorsum, to whitish at sides. Abdomen light olivaceous; complete black mid-dorsal band from segment 1 to terminal third of 8, with ante-terminal dilatations on 2-6; 10 olivaceous. Vulvar spine strong; valvae projecting slightly beyond

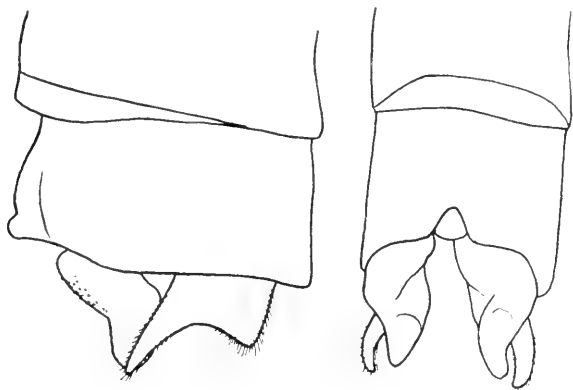


FIG. 39.—*Enallagma fractum*, ♂. Kapiri. Appendages, right side and dorsal view.

the end of abdomen. Pterostigma considerably lighter than in male and slightly larger. Venation as in male.

♂, *Abd.* 26, *hdw.* 17 mm. ♀, 26, 19.

#### ENALLAGMA SINUATUM, n. sp.

S. Afr. Mus.: 1, ♂ Salisbury, Mashonaland (1894, G. A. K. Marshall); 3 ♀, M'Fongosi, Zululand (iv. 1911, W. E. Jones). Coll. E. B. Williamson: 1 ♂, 1 ♀, Salisbury (iv. 1905, Marshall). Mus. Tervueren: 1 ♂, 1 ♀, Kapiri, Katanga (ix, x. 1912, Legros).

Very similar to *fractum* in stature and colour system, but slightly larger and with marked difference in the appendages of male.

♂ (Kapiri). Occiput light greyish ochreous. Labium whitish. Dorsal surface of head greyish blue. A transverse black band from slightly behind the base of antennae to near the occipital margin,



where a narrow line on this margin and large postocular spots remain blue, the latter merging into the light colour of occiput. Prothorax greyish blue, lighter at the sides, a small mid-dorsal dark spot. Thoracic dorsum (discoloured?) light golden brown; a narrow ferruginous line at median suture, black contiguous stripes of something less than one-half the breadth of mesepisterna; narrow black line in humeral suture, lightly enlarged in ventral third and ending in a black point dorsally; yellowish colour extending narrowly beyond humeral suture; sides otherwise very light greenish blue, small black dot in dorsal end of second lateral suture; ventral side whitish. Legs very light greyish ochreous; a mere trace of dark lines on external side of femora and tibiae.

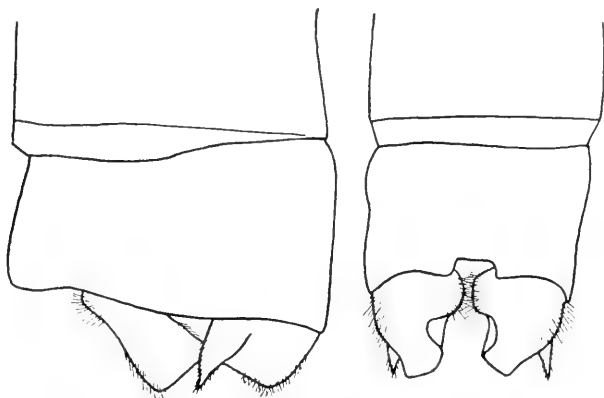


FIG. 40.—*Enallagma sinuatum*, ♂. Kapiri. Appendages, right side and dorsal view.

Abdomen very slender; light greenish blue, marked black, sides of segments 3–6 yellowish. Segment 1 very small black dorsal spot at base; 2 small mid-dorsal posterior spot, narrowly joined to lanceolate dorsal line, which ends in a point at the anterior fourth; 3–6 narrow mid-dorsal line, shortly interrupted at anterior end and slightly dilated near posterior end of each segment; 7 broader mid-dorsal band remaining slightly short of both ends; 8–9 blue; 10 blue with narrow mid-dorsal black band. Appendages dark reddish brown (Text-fig. 40).

Venation dark; pterostigma dark greyish brown.  $M_2$  and  $M_{1a}$  at  $Puq$  6 + 4 in front wing, 6 + 3 in hind wing.

♀. Very light reddish ochreous; sides and ventral side of thorax whitish. Black transverse band of frons as broad as ocellar region in

the middle, narrowed to about one-half at the sides; narrow ferruginous lines from posterior to anterior ocellus and from this to anterior margin of black transverse band; in front of anterior ocellus a very narrow black transverse line, concave anteriorly. On thoracic dorsum the median yellowish line broader, the black stripes narrower than in male, about one-third of breadth of mesepisterna. Black dorsal spot of segment 2 only slightly narrowed in front of the terminal dilatation and running through to anterior end; 3-6 mid-dorsal band slightly broader, otherwise as in male; 7 as in male; 8 mid-dorsal black band on anterior two-thirds; 9 two dorsal basal black spots; 10 entirely light coloured. Vulvar spine strong; vulvae level with the abdominal end.

Pterostigma light greyish ochreous, larger than in male.  $M_2$  and  $M_{1a}$  in front wing at  $Pnq$   $6 + 2$ ,  $6 + 3$  or  $6 + 4$ , in hind wing  $5 + 3$  or  $5 + 4$ .

♂, *Abd.* 28, *hdw.* 19 mm. ♀, 30, 21.

#### ENALLAGMA SUBTILE, n. sp.

Mus. Tervueren: 2 ♂, 5 ♀, Kapiri, Katanga (ix, x. 1912, Legros).

♂. Occiput and labium whitish. Labrum light ferruginous, lined with whitish. Dorsal surface of head light ferruginous; a black transverse band across the ocelli, as broad as the ocellar region in the middle, narrowed laterally, and partially cut through by narrow oblique ferruginous lines from posterior ocellus to base of antennae. First and second joint of antennae ferruginous, the rest black. Prothorax light ferruginous dorsally, very light ochreous at the sides. Thoracic dorsum light ferruginous; at each side of the ferruginous median suture a narrow black line, not broader than the ferruginous line on the suture. Extremely narrow black line on humeral suture and small black dot in its dorsal end. Sides and ventral side very light ferruginous, almost whitish, a very small black dot in dorsal end of second lateral suture. Legs whitish ochreous, spines alone blackish.

Abdomen very slender. Segments 1-7 very light ochreous at the sides; dorsally blackish as a band of about one-third the segment's breadth, narrowly interrupted at anterior end and slightly dilated before posterior end of each segment; dorsal band deeper black and slightly broader on 7; 8-10 very light greyish blue, shading laterally into whitish ochreous. Appendages very light ochreous, only the extreme tip of the inferior obscure (Text-fig. 41).

Venation very thin, partly greyish ochreous. Pterostigma thin, very light ochreous.  $M_2$  and  $M_{1a}$  at  $Pnq$   $5 + 2$  or  $5 + 3$  in front wing,  $4 + 3$  or  $4 + 4$  in hind wing.

♀. Very similar to male in colour, the following being different: dark lines at median thoracic suture not blackish, only reddish brown with a small blackish nucleus. Blackish mid-dorsal band of segments 1-7 slightly narrower, narrowly extended on anterior half of 8; no bluish shade on terminal segments. Vulvar spine strong; valvae slightly projecting beyond abdominal end.  $M_2$  and  $M_{1a}$  in male.

♂, *Abd.* 25, *hdw.* 15 mm. ♀, 24, 16 to 26.5.

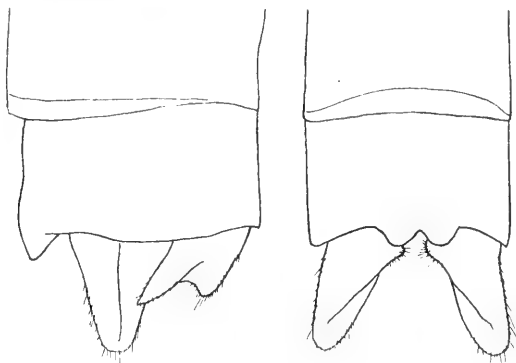


FIG. 41.—*Enallagma subtile*, ♂. Kapiri. Appendages, right side and dorsal view.

### ISCHNURA (Charpentier, 1840).

A cosmopolitan genus, somewhat peculiar in the geographical distribution of its species. Some species range over an exceedingly wide area, but there is generally only a very small number of species in one geographical region—mostly one or two; certain other species have a rather narrowly limited distribution, inhabiting chiefly dry regions (Western North America, Mediterranean, Europe and North Africa, Central Asia). The European *I. elegans* is one of the most common *Odonata* of that continent, and remarkable for not being at all particular to the quality of water it inhabits, resisting evidently a considerable amount of pollution. Similar resistance may account for the wide distribution of other species.

#### ISCHNURA SENEGALENSIS (Rambur, 1842).

S. Afr. Mus.: 1 ♀, King Williamstown, Cape Colony; 1 ♂, Dunbrody, Blue Cliff (ii. 1912); 1 ♂, 1 ♀, Newcastle, Natal (1893, A. E. Hunt); 3 ♂, Lorenzo Marques (18. 22. xi. 1911); Otjituo, S.W. Protectorate (i. 1920, Tucker). Brit. Mus.: 4 ♂, 4 ♀, Deelfontein (6. i. 1903, Col. Sloggett). Mus. Stockholm: 2 ♂, 3 ♀, Caffraria

(Wahlberg); 1 ♂, 1 ♀, Mashonaland (Marshall). Coll. Ris: 1 ♂, Lorenzo Marques, "bord de la mer" (1914, H. Junod). Mus. Hamburg: 2 ♂, 1 ♀, Lorenzo Marques (17 . ix . 1911, Michaelsen); 1 ♀, Beira (22 . ix . 1911, *id* ).

♂. Occiput and labium whitish. Labrum, anteclypeus, genae, frons not quite to base of antennae green. Postclypeus brilliant metallic blue. Dorsal surface of head otherwise bronzy black; small, circular bright blue postocular spots. Prothorax bronzy black, sides and a narrow anterior border bluish; hind lobe small, shallowly divided in three rounded lobes, the lateral ones very narrow, the median one slightly broader and semi-erect. Thoracic dorsum bronzy black; narrow regular ante-humeral lines bluish, ventral side yellowish

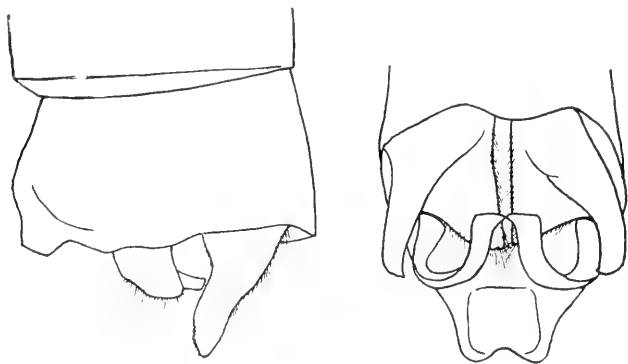


FIG. 42.—*Ischnura senegalensis*, ♂. Blue Cliff. Appendages, right side and postero-ventral view.

white. Legs yellowish, external side of femora broadly, of tibiae narrowly black.

Abdomen moderately stout. Segment 1 blue with a mid-dorsal black band; 2 blue on sides, brilliant metallic blue on dorsum; 5-7 yellowish on sides, bronzy black on dorsum, the yellow colour ascending in very narrow basal rings; 8 blue; 9-10 blue on sides with black mid-dorsal band. Appendages (Text-fig. 42).

Pterostigma narrow, slightly elongate, rhomboid, of equal form in both wings; black in proximal, whitish in distal half in front wing, light greyish ochreous in hind wing.

♀. *a.* (Andromorphous or homoeochromatic form.) Almost entirely similar to male in colour, the only appreciable differences being dorsum of segment 2 bronzy black with only an indication of metallic blue, sides of segments 3-7 rather olivaceous than yellowish. Pterostigma concolorous, greyish ochreous in both wings.

*b.* (Heterochromatic form.) Light colour on thorax and head bright orange in immature specimens, shading to dull orange, brownish or olivaceous in fully mature specimens. Light colour extended on head, thorax and base of abdomen; postocular spots large, cuneiform, united to pale colour of occiput; prothorax only with a narrow mid-dorsal black band. Segment 1 entirely pale; 2 with a narrow terminal ring and small terminal dorsal spot bronzy black. On the other hand, the eighth abdominal segment is not of the light colour in this form, but bronzy black dorsally, like the preceding and following segments.

Hind lobe of prothorax in both forms similar to male, but narrower and less distinctly trilobed.

♂, *Abd.* 23, *hdw.* 15 mm. ♀, 24, 17.

This species is known from Africa, the islands of the Indian Ocean, tropical and sub-tropical Asia in continental and insular distribution, common in coast districts, perhaps frequenting brackish waters, and consequently omnipresent in collections, be they ever so scanty, brought from those vast regions. The relatively small number of *senegalensis* in our South African collections is rather surprising, and may indicate that at least the temperate parts of the region are beyond the limits of the best conditions for its existence. *I. senegalensis* is the only *Ischnura* known from Africa south of the desert belt. It seems to be common in Egypt (Cairo, the Pyramids, etc.), and the only *Ischnura* yet found there; but it is not yet recorded from Algeria, Tunisia or Tripolitania, where three other (Mediterranean) species of the genus occur.

#### AGRIOCNEMIS (Sélys, 1877).

A genus known from the inter-tropical parts of the Old World. The species are probably rather numerous, but very imperfectly known. The analogies (and probably affinities) of *Agriocnemis* and *Ischnura* are striking in colour system as well as in some physiological features.

Some of the *Agriocnemis* species are, in spite of their dwarfed stature and exceedingly fragile frame, found over immense areas (*pygmaea* and *femina*). *Agriocnemis* contains the smallest known species of Odonata.

#### AGRIOCNEMIS EXILIS (Sélys, 1872; Sjöstedt, 1909).

Mus. Hamburg: 2 ♂, 6 ♀, Beira (22. ix. 1911, W. Michaelsen).

♂. Occiput and labium whitish. Labrum brilliant metallic green. Genae, mandibles and a narrow transverse band in front of antennae light green. Dorsal surface of head otherwise bronzy black; very

small circular blue postocular spots. Prothorax black, sides and anterior margin broadly light green, a very narrow green border at posterior lobe. Posterior lobe moderately broad, semi-erect, nearly semicircular in outline, with a small notch near each lateral end. Thoracic dorsum black, this colour invading the sides to first lateral suture; narrow, complete ante-humeral lines; remainder of sides and ventral side very light green; a minute black dot in dorsal end of second lateral suture. Legs whitish, incomplete black lines on lateral side of femora; indication of two dark rings on second and third femora.

Abdomen segments 1-3 bronzy black on dorsum, with a shade of metallic blue, 1-2 greenish, 3 ochreous laterally; 4-5 ochreous or light orange, with a narrow mid-dorsal dark line, which is enlarged near the end, and followed by a narrow complete orange ring at the

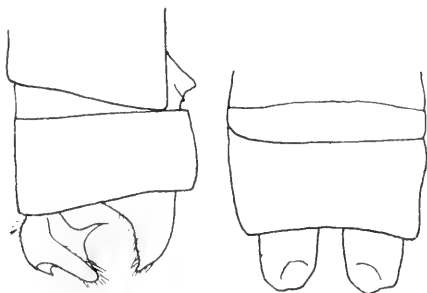


FIG. 43.—*Agriocnemis exilis*, ♂. Beira. Appendages, right side and ventral view.

end of each segment; 7 black dorsally, orange laterally, and in a complete terminal ring; 8-10 bright orange red. Appendages orange red (Text-fig. 43).

Pterostigma greyish ochreous; 6 post-nodal cross-veins in front wing, 5-6 in hind wing.

♀. Labium, ante- and postclypeus orange, very narrow black transverse lines at base of labrum and postclypeus. Postocular spots orange, very large, cuneiform, fused to light colour of occiput. Hind lobe of prothorax trilobate; median lobe very narrow in antero-posterior direction; side lobes nearly semicircular in outline, projecting by about twice the height of median lobe. Thoracic dorsum black in a broad median stripe and a very narrow line in humeral suture; the much enlarged ante-humeral band and side to first lateral suture ochreous or very light orange; rest of sides and ventral side gradually shading through light green to whitish.

Abdomen ochreous or dull orange at sides; dorsum of segments 1-5 bronzy brown, 6-9 black, 10 orange with a basal black spot.

Pterostigma very light ochreous. Post-nodal cross-veins 8 in front wings, 7 in hind wings.

Immature females have abdominal segments 1-6 orange, with very narrow black rings at the joints; in one specimen the dark colour of dorsum appears in narrow and incomplete lines.

♂, *Abd.* 16.5, *hdw.* 10 mm. ♀, 19, 12.

A badly damaged female from Bukama (29. v. 1911, Dr. Bequaert) is probably of the same species (Mus. Tervueren). In Mr. E. B. Williamson's collection there is a pair of *Agriocnemis* from Salisbury, Mashonaland (ii. 1900, Marshall) which probably belong to a different species, but they are too much damaged for identification. The same reservation is to be made for two males in the British Museum collections, one labelled "Marshall collection 1910," without locality, the other one "N.E. Rhodesia, Upper Luangwa River (27. vii, 13. viii, 1910, S. A. Neave)."

Probably several species of the genus exist in the faunal region here discussed, but none is to be expected outside that part of the region where climatic conditions are of the tropical type.

## II. SUBORDER ANISOPTERA.

*Anisoptera* are the "dragonflies" in restricted sense, the strongly built, swiftly moving and generally larger members of the Order. American authors give, in contrast to them, the name "damselflies" to the tiny *Zygoptera*.

The various divisions of Anisoptera are rather different in habits, and some indications regarding them may better be reserved to the single groups. The larger subfamilies are represented in the fauna under discussion by a fair number of species, only the *Cordulinae* being poor; three subfamilies, all belonging to the family *Aeschnidae* and each consisting of a very limited number of species, are absent from the South African as well as from the Ethiopian fauna and not likely to be found there (the oriental *Chlorogomphinae*, palaeo-nearctic *Cordulegasterinae* and the *Petalurinae*, of which a few species persist as a kind of "living fossils" in Australia, Chili, North America and Japan).

- C. Lateral lobes of labium of about equal size as median lobe, two-jointed, the terminal joint narrow and pointed (Text-fig. 2). Triangles similar in both pairs of wings, their longer axis in the long axis of the wing; their proximal side distal to the arculus in both wings.

Ante-nodal cross-veins predominantly not coincident in costal and subcostal space; two of them always coincident and crossing the double space as triangular membranes. Proximal anal border of hind wings (*Anax* excepted) excised in males; lateral earlets on second abdominal segment of males . . . . . Fam. *Aeschnidae*.

- CA. Eyes separated by a large space (Text fig. 2). Ocelli free or only partly covered by a transverse ridge.

Costal side of triangle not exceeding considerably in length the proximal side. No radial supplement parallel to vein *Rs*. Female genital opening covered by a vulvar scale. Inferior appendage of male bifid

Subfam. *Gomphinae*.

- CB. Eyes contiguous in the median line for a considerable space. Ocelli situated at the foot of a frontal vesicle. Costal and anal side of triangle considerably exceeding the proximal side in length. A radial supplement roughly parallel to vein *Rs*. Female genital opening armed with an ovipositor in the manner of *Zygoptera*. Inferior appendage of male not bifid . . . . . Subfam. *Aeschninae*.

- D. Lateral lobes of labium very large, touching each other in the median line to form a mask-like structure; median lobe very small; no second joint to the lateral lobes (Text-fig. 3). Triangles dissimilar in both pairs of wings; their longer axis in the short transverse axis in the front wing, in the long axis in the hind wing; very often dissimilar also in position; distal to the arculus in front wing, at the arculus in hind wing. Ante-nodal cross-veins coincident in costal and subcostal space (except in many cases the last one, which remains limited to costal space); all of them equal in structure. Females with vulvar scale. Inferior appendages of males not bifid . . . . . Fam. *Libellulidae*.

- DA. Proximal anal border of hind wings excised in males; lateral earlets on second abdominal segment of males. A small projection at the occipito-temporal border of eyes in both sexes. Mostly metallic colours on body

Subfam. *Cordulinae*.

- DB. Proximal anal border of hind wings rounded in both sexes; no earlets on second abdominal segment.

No distinct projection (indicated in *Urothemis*) at the occipito-temporal border of eyes. Colour system mostly not metallic

Subfam. *Libellulinae*.

## II CA. SUBFAMILY GOMPHINAE.

*Gomphinae* are a very homogeneous lot throughout the world in the superficial (though probably phylogenetically very important) character of colour system. Their numerous species show an infinite variation of a pattern of black and yellow, the black parts of which may pass through many shades of brown to light ferruginous or greyish ochreous in the palest forms, whereas the yellow parts may pass to orange or through various shades of olivaceous to pure green, very rarely to blue.



Coloured wings are exceedingly rare in this subfamily.

Almost as uniform as the colour system is the neurulation in its principal features and even down to rather minute details; nevertheless a careful investigation (initiated chiefly by Mr. E. B. Williamson) has brought forth a number of pretty constant and systematically valuable differences. To the uniformity in colour and neurulation the great and conspicuous variety in the male terminal appendages is in strong contrast. It is natural that these differences, which form an attractive object of study, should have guided the first monographers in their descriptions, and, unfortunately, also in their attempts at a systematic arrangement. Great difficulties arise from this latter point before the student, especially where females alone are at hand. A new disposition of the subfamily, based, not on unisexual characters, but chiefly on neurulation, as a bisexual as well as phylogenetically important character, is a need of the time, and the chief lines of such a disposition are drawn by Mr. Williamson for a limited geographical (Oriental) group. This disposition will be followed here as well as in other publications of the writer.

Uniform as their colour pattern is also the manner of life of *Gomphinae* (and both uniformities may well be esteemed interdependent). Their flight is exceedingly swift but not lasting; they mostly stay on the ground, or very close to the ground on low vegetation, rarely ascending to some height in bushes; from their resting-place they take swift flights, darting upon some prey, or upon an intruder of their own or an allied kind, and then return with equal rapidity to their starting-point or alight not far from the same. Most of them are very wary insects, and this quality, together with the highly cryptic character of their pattern in natural haunts, answers for the fact that many *Gomphinae* are very rare in collections, many described from single specimens, and many still to be discovered in the less worked districts of the globe. Perhaps there are more species of limited range in *Gomphinae* than in most other groups of *Odonata*, though wide ranging forms are by no means absent. Where they are better known most species have been ascertained to inhabit running waters, from very slow to quite swift kinds. A few only are known to live in still waters, but the larger number where there is motion in the water, and very few are inhabitants of small ponds and swamps which abound in many other kinds of dragonflies.

Plate XII, fig. 3, gives an idea of the larvae of the more typical groups; the flat body, short labium, elongate and flattened third joint of antennae, fossorial structure of the hard and villose legs are the characteristic external features of the *Gomphus* nymph. But the

subfamily is rich in various adaptations to live on the ground, or even buried in sand or mud; some curious and even grotesque forms exist in tropical Africa.

The South African representation of the subfamily is comparatively poor; but it is not improbable that more species remain to be discovered.

1. Legs short, third femora not reaching beyond the joint between thorax and abdomen. Discoidal field in front wings more distally and less widened than in (2), divergence of  $M_4$  and  $Cuq$  beginning at the level of nodus or more distally. Between  $M_{1-3}$  and  $M_4$  in hind wing a single cross-vein (Plate VIII, figs. 3, 4, 5, 6). Lateral margin of abdominal segments 9, or 8 and 9, foliate.

Legs long, third femora reaching to the joint between abdominal segments 2 and 3. Discoidal field in front wings much dilated to the border, divergence of  $M_4$  and  $Cuq$  beginning proximally to the level of nodus. Between  $M_{1-3}$  and  $M_4$  in hind wing two cross-veins. No indication of anal loop in hind wing, all branches of  $A$  running parallel in about right angles to the anal margin (Plate VIII, fig. 2). Abdomen cylindrical. Lateral margin of terminal abdominal segments not foliate. Superior appendages of male scarcely longer than tenth segment, simple; inferior appendage of about equal length, divided in two widely divergent branches . . . . . *Podogomphus*.

2. A distinct anal loop in hind wing, by convergence of  $A_3$  and  $A_4$  at their beginning and coincidence of cross-veins (Text-fig. 5, Plate VIII, figs. 5, 6) . . . . . 4.  
No distinct anal loop in hind wing, at most some convergence of  $A_3$  and  $A_4$  at their beginning, but no coincidence of cross-veins (Plate VIII, figs. 3, 4). Segments 8 and 9 foliate . . . . . 3.

3. Pterostigma large. Third to seventh abdominal segments comparatively robust. Superior appendages of male but little longer than tenth segment, not approximate nor touching each other in the mid-dorsal line; inferior appendage of about equal length. Structure of female genital segments much as in preceding genus . . . . . *Crenigomphus*.

Pterostigma moderate. Third to seventh abdominal segments very slender. Superior appendages of male considerably longer than tenth segment, approximate in the mid-dorsal line, so much as to be contiguous at least in the basal half or two-thirds; inferior appendage considerably shorter, deeply divided in two contiguous branches. Female with vulvar scale broad and comparatively short; on ventral plate of ninth segment a corresponding shallow groove, bordered by a low ridge . . . . . *Mesogomphus*.

4. Anal loop two-celled (Plate VIII, fig. 5). Segments 8 and 9 foliate. Male with appendages much longer than tenth segment.

Female with vulvar scale and ninth ventral plate much as in *Mesogomphus*  
*Onychogomphus*.

Anal loop of more than two cells (Plate VIII, fig. 6). Only the eighth segment foliate at lateral margin. Male with appendages much shorter

than tenth segment. On dorsum of tenth segment an acute process which fits into a groove on dorsum of ninth segment. Female with vulvar scale long and narrow, fitting into a corresponding groove on ventral plate of segments 9 and 10 . . . . . *Ceratogomphus*.

# PODOGOMPHUS (Karsch, 1890).

A genus of African, mostly East African, distribution; a small number of species are described from a very limited number of specimens. *Podogomphus* is closely allied to the large palaearctic genus *Gomphus*, from which it differs chiefly by the extremely developed third pair of legs; the neural characters, type of genitalia and appendages, and the colour system being much the same as in *Gomphus*.

## PODOGOMPHUS PRAETORIUS (Sélys, 1878).

S. Afr. Mus.: 1 ♂, M'Fongosi, Zululand (xii. 1911, W. E. Jones); 1 ♂, Barberton, Transvaal. Brit. Mus.: 1 ♂, Mazoe, 4000 ft., Mashonaland (29. xii. 1905, Marshall). Coll. K. J. Morton: 1 ♂, Stutterheim (13. i. 1908, Miss Fountaine). Mus. Tervueren: 1 ♀, Elizabethville, Katanga (9. iii. 1912, Dr. Bequaert).

Colours in adult specimens very light yellow with a shade of greenish, and deep black.

♂. Labium, labrum, face and frons yellow; a narrow and slightly diffuse transverse black line in the middle of anterior surface of frons, slightly curved dorsal in the middle to touch an opposite curve of the frontal ridge. Base of frons rather narrowly black (less than one-third of dorsal surface). Vertex black with a narrow laterally incomplete black line at the ocelli. Occipital plate yellow, the free margin narrowly bordered with black, slightly convex, with black lines. On vertex a narrow transverse ridge, rounding the ocelli in a lateral curve; in front of its median straight part a second, more obtuse transverse ridge between the lateral ocelli. Thoracic pattern, Plate IX, fig. 1. Legs robust, the first pair the shorter, third pair very long (femora 10 mm.). Third femora besides the regular two rows of short spines with 3-4 long and very acute spines at the medial, 2-3 equal spines at the lateral side. Legs mostly yellow, black lines on first and second femora rather broad, very narrow on third femora; internal side of tibiae black; tarsi black.

Abdomen slender, segments 1-2 slightly dilated, 3-10 almost regularly cylindrical and comparatively long. Yellow complete lateral black bands from 1 to 10, distant from the lateral margins by slightly

less than their own breadth, and approaching dorsally so that the dorsal yellow band is narrower than each black band. This mid-dorsal yellow band trilobed on segment 2, narrowly interrupted by terminal black rings on the other segments. Appendages (Text-fig. 44) —superior black, inferior yellow with black tips. Genitalia of second

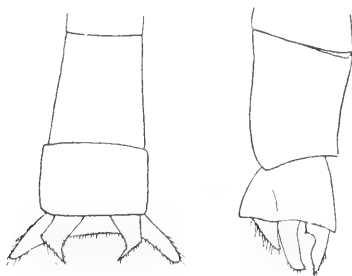


FIG. 44.—*Podogomphus praetorius*, ♂. M'Fongosi. Terminal segments, dorsal and left side view.

segment (Text-fig. 45) yellow, extreme tips of hamuli black, sheath dark brown.

Wings very light greenish yellow to level of *t*, and still lighter from half-way between nodus and pterostigma and to apex. Pterostigma bright yellow between narrowly black veins.

♀. Free margin of occipital plate not deeply trilobate; vertex as in male. Third femora as in male, but spines still more robust, 5–6

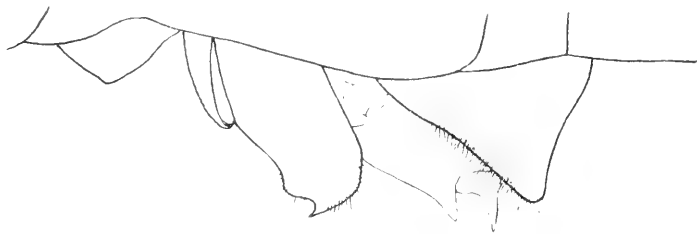


FIG. 45.—*Podogomphus praetorius*, ♂. M'Fongosi. Genitals, second segments left, side view.

medial, 4 lateral strong spines. Abdomen more robust, slightly contracted in segments 9–10. Sub-anal plates and supra-anal tubercle yellow, appendages black. Appendages, sub-anal plates, and supra-anal tubercle pointed, all of about equal length. Vulvar scale half as long as ninth ventral plate, comparatively narrow, slightly contracted at the end, where there is a small triangular excision, continued in a furrow over about half the length of the plate.

♂, *Abd.* 36, *hdw.* 31, *pt.* 4 mm. ♀, 38, 34, 4.5.

# MESOGOMPHUS (Forster, 1906).

An African genus, probably also embracing some species from India. No doubt it is closely allied to *Onychogomphus*, but the neural character given in the table (p. 340) seems quite constant, and has the advantage of uniting a group which is also distinguished by a peculiar type of male appendages. For the moment I do not know of other than geographical reasons for separating *Mesogomphus* from the American genus *Erpetogomphus*. From a note by M. René Martin it would appear that the larval type of *Mesogomphus* (Hageni) is rather widely different from the *Onychogomphus* larva and approaching *Gomphus*; but I have reasons to suspect that some error of observation has occurred, and that *Mesogomphus* larvae are really of the *Onychogomphus* type.

The name as given by Forster is homonymous with a fossil genus, *Mesogomphus*, named by Handlirsch. But as both publications date apparently from the same month and cannot be dated to a day, I thought it advisable to adopt the name as given for the living group.

## Table of Males.

1. Tips of superior appendages parallel, acute. Obscure band of base of frons light ochreous or absent. Obscure markings of thorax limited and comparatively light . . . . . 2.  
 Tips of superior appendages divergent, blunt and dentate. Broad black band on base of frons. Obscure markings of thorax comparatively large, dark brown. Costa light yellow. Pterostigma blackish brown  
*M. cognatus.*
2. Pterostigma dark ferruginous. Superior appendages more robust than in the following species, almost straight at base, strongly curved downward in distal fourth; inferior appendages less than half as long as the superior . . . . . *M. elpidius.*  
 Pterostigma light ochreous, encircled by a greyish shade. Superior appendages very slender, curved downward in a gentle curve in their second half; inferior appendage more than half as long as the superior  
*M. Hageni.*

## Table of Females.

1. Pterostigma dark brown . . . . . 2.  
 Pterostigma light ochreous, encircled by a greyish shade, between strong black veins. No obscure markings on face and anterior surface of frons. Thoracic markings pale reddish brown, often diffuse . . . *M. Hageni.*
2. Face and frons anteriorly without obscure markings. Thoracic markings dull reddish brown (Plate IX, fig. 3). . . . . *M. elpidius.*  
 Face and frons anteriorly with black transverse lines. Thoracic markings blackish brown to almost black (Plate IX, fig. 4) . . . *M. cognatus.*

## MESOGOMPHUS HAGENI (Sélys, 1870).

S. Afr. Mus.: 1 ♂, 1 ♀, Waterval, Transvaal (3, 14 . xi . 1899); 1 ♀, Dunbrody, Cape Colony (6 . iii . 1912). Brit. Mus.: 1 ♂, N.E. Rhodesia, Mid. Luangwa, 13-1800 ft. (23-31 . viii . 1910, S. A. Neave). Mus. Tervueren: 1 ♀, Bukama (17 . vii . 1911, Dr. Bequaert). Mus. Rothschild, Tring: 1 ♀ Biskra. Coll. Ris: 1 ♂, 2 ♀, River Errer, Harrar, Abyssinia (vi, vii . 1911, Kristensen); 1 ♂, Eritrea (*id.*); 1 ♂, Tozeur, Tunisia (10 . v . 1913, Dr. A. v. Schulthess).

Dull olivaceous, probably light and rather pure green on head and thorax in living specimens; markings light and somewhat dull ferruginous, slightly variable individually in depth of colour and extent.

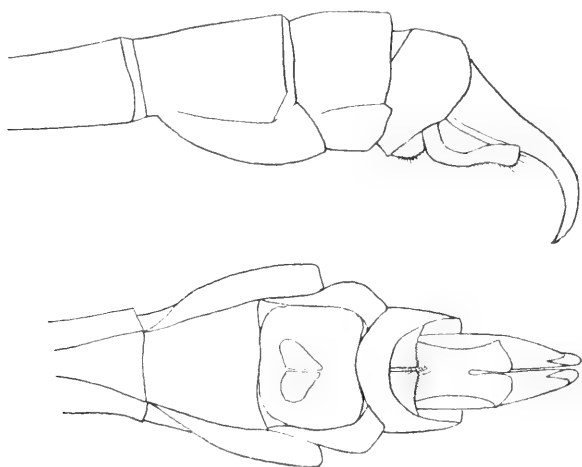


FIG. 46.—*Mesogomphus Hageni*, ♂. Waterval. Terminal segments, ventral and left side view.

♂. Labium whitish. Labrum, face, frons, vertex and occipital plate light green, the only obscure marking being a transverse band across the ocelli on anterior part of vertex and base of frons. Anterior ridge of frons strongly convex, sinuate in the middle, with two irregular lateral groups of black granulations. Free margin of occipital plate slightly concave, a low and indistinct longitudinal ridge on the plate. Vertex projecting in a low, anteriorly convex ridge over the ocelli. Occiput dull ochreous. Thoracic pattern, Plate IX, fig. 2.

Legs olivaceous, spines black; a mere trace of black lines on first and second tibiae; third tibiae blackish internally.

Abdomen very slender, segments 1-2 slightly dilated, 3-7 cylindrical, 8-10 dilated in lateral and dorso-ventral dimensions; lateral margin of 8-9 foliate.

Segments 1-7 dull olivaceous, obscure markings small and rather diffuse: basal half of segment 1; lateral and dorsolateral bands on 2; narrow ring at anterior transverse carina, broader terminal ring and indistinct lateral and posterior spots on 3-6; 7 greenish on anterior, dull ferruginous on posterior half; 8-10 ferruginous, dilations of 8-9 darker to almost black.



FIG. 47.—*Mesogomphus Hageni*, ♂. Eritrea. Genitals, second segment, left side view.

Appendages ochreous, Text-fig. 46. Genital organs of second segment, Text-fig. 47.

Wings hyaline, lightly tinged with greenish yellow in very adult specimens; costa yellow to base of pterostigma; pterostigma, see p. 343.

♀. Very similar to male. No structural differences in vertex and occipital plate. Abdomen considerably more robust; terminal abdominal segments comparatively less dilated. Appendages longer than tenth segment, very fine and pointed, light yellowish, tips black

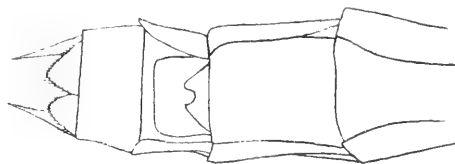


FIG. 48.—*Mesogomphus Hageni*, ♀. Waterval. Terminal segments, ventral view.

Ventral plate of ninth segment concave, the cavity bordered near the segment's end by a sharp, almost semicircular ridge. Vulvar scale slightly less than one-half the length of segment 9, roughly triangular in outline, excised (Text-fig. 48).

♂, *Abd.* 31 + 3, *hbw.* 23, *pt.* 3 mm. ♀, 32, 26, 3 (Waterval).

♂, *Abd.* 28 + 3, *hbw.* 22, *pt.* 2.5 mm. (Eritrea). ♀, 32, 27, 3 (Harrar).

No appreciable differences in structure or colour exist between South African, Abyssinian and Algerian specimens of this wide-ranging species.

## MESOGOMPHUS ELPIDIUS, n. sp.

S. Afr. Mus.: 2 ♂, M'Fongosi (Zululand, iii, iv. 1911, Jones). Mus. Tervueren: 1 ♀, Kapiri, Katanga (xi. 1912, Legros).

Similar in colour to *M. Hageni*, but obscure markings deeper in colour and more sharply defined.

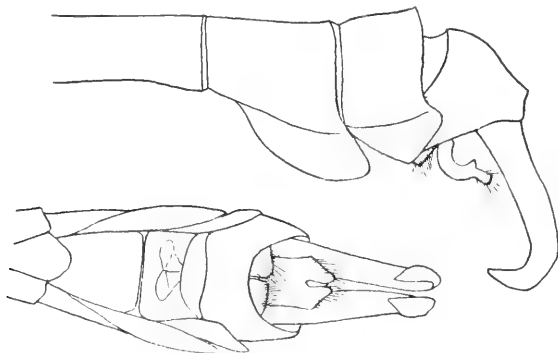


FIG. 49.—*Mesogomphus elpidius*, ♂. M'Fongosi. Terminal segments, ventral and left side view.

♂. Labium dull whitish ochreous. Labrum, face and frons very light yellowish green, light and very diffuse brownish traces at anterior margins of labrum, ante- and postclypeus; brownish transverse band on anterior face of vertex across the ocelli, slightly encroaching on the base of frons. Vertex as in *M. Hageni*; occipital plate without the



FIG. 50.—*Mesogomphus elpidius*, ♂. M'Fongosi. Genitals, second segment, left side view.

longitudinal ridge. Thoracic pattern, Plate IX, fig. 3. Legs dull ochreous; narrow lines on femora and their ends darker brownish; internal side of tibiae, lateral side of third tibiae, tarsi and spines blackish.

Abdomen similar in form to *M. Hageni*, but still more slender, the dilatation of terminal segments being comparatively greater, the lateral foliaceous dilatations of segments 8-9 broader. Dull olivaceous, markings dark ferruginous, very diffuse (both specimens rather dis-



coloured). Segments 1-2 discoloured; 3-7 dorsally a small spot in front of anterior carina and terminal half ferruginous, laterally a spot at the carina and terminal third; 8-10 bright ferruginous, 8-9 darker dorsally at base; foliaceous dilatations blackish. Appendages ferruginous (Text-fig. 49). Genital organs of second segment, Text-fig. 50.

Wing light yellowish, especially along veins; costa light yellowish to base of pterostigma, other venation dark. Pterostigma dark ferruginous between black veins.

*Abd.* 26 + 3, *hdw.* 22, *pt.* 3 mm.

♀. No certainty exists about the identity of this female with the typical males; but since the thoracic pattern is very much the same, the identification here suggested seems probable. In this female the anterior, dorsally directed branch of the obscure band on second lateral suture is longer and broader, the same colour at latero-ventral border of metepimeron is more developed than in the male figured (Plate IX, fig. 3). The markings of the abdomen seem somewhat different

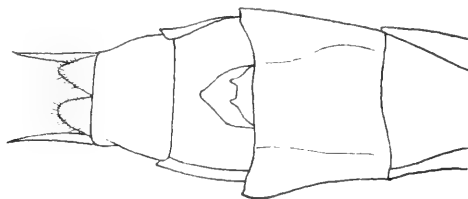


FIG. 51.—*Mesogomphus elpidius*, ♀. Kapiri. Terminal segments, ventral side view.

(in better condition). Abdomen reddish ochreous, a blackish lateral longitudinal line on segments 2-6, dilated dorsally at the anterior carina, and narrowly interrupted at the anterior margin and contracted in the middle of each segment; segment 7 ochreous in basal, dark ferruginous in apical half; 8-10 dark ferruginous. Only a slight indication of the foliaceous dilatations on segments 8-9. Groove on ventral plate 9 much smaller than in *Hageni*; roughly triangular in outline; vulvar scale smaller, with broader terminal excision (Text-fig. 51). Appendages very fine and pointed, light ochreous. Yellow line on costal vein narrower than in male. Pterostigma as in male.

*Abd.* 32, *hdw.* 28, *pt.* 3.5 mm.

#### MESOGOMPHUS COGNATUS (Rambur, 1842).

S. Afr. Mus.: 1 ♂, 1 ♀, Waterval, Transvaal (10 . x, 14 . xi . 1899); 1 ♂, Barkley West, Cape Colony (xii . 1893, L. Péringuey); 1 ♀, White

River, East Transvaal (i. 1910, A. T. Cooke); 2 ♂, M'Fongosi, Zululand (iii, xi. 1911, Jones); Otjituo and Gaub, S. W. Protectorate (i. 1919, Lightfoot). Brit. Mus.: 1 ♂, Cap. Bon Spei (very old specimen); 1 ♀, Natal; 1 ♀, Durban, Natal (iii. 1896); 2 ♂, 1 ♀, Mazoe, 4000 ft., Mashonaland (24, 26. xii. 1905, Marshall). Coll. E. B. Williamson: 2 ♀, Princetown, Natal (9, 19. xii. 1908, G. F. Leigh); 3 ♀, Hilton Road, 3800 ft., Natal (20, 21, 23. xii. 1909, *id.*); 1 ♂ ♀, *in cop.*, Salisbury, 5000 ft., Mashonaland (i. 1900, Marshall); 1 ♀, Umtali, 3700 ft., Mashonaland (xii. 1900, *id.*). Mus. Tervueren: 1 ♂, 3 ♀, Kapiri, Katanga (x, xi. 1912, Legros). Coll. Ris: 2 ♂, River Errer, Harrar, Abyssinia (vii. 1911, Kristensen).

Dull yellowish, markings dark brown to almost black.

♂. Labium light yellowish, points of lateral lobes dark. Labrum, face and frons yellow with blackish marks, the free margin of labrum very narrow, a broader transverse line on base of labrum projecting anteriorly in the median line; anterior margin of postclypeus rather broadly marked; broader transverse band across anterior side of frons, convex dorsally and touching the ridge in the median line; dorsally anterior half of frons yellow, posterior half black, an irregular row of black granulations along the anterior ridge. Vertex dull ferruginous above, passing anteriorly into yellowish, blackish in front across the ocelli. Occipital plate yellow; free margin very slightly convex; anterior surface very shallowly concave with a round, low, central convexity. Vertex almost continuous to occipital plate, very slightly convex, then with a shallow transverse groove and a slightly concave, almost horizontal plane, which ends in a blunt ridge above the ocelli. Thoracic pattern, Plate IX, fig. 4 (slightly variable individually; in some specimens the yellow spot at the ante-alar sinus is fused to the juxta-humeral line, in some the humeral suture is narrowly lined with yellow). Legs yellowish, three narrow, almost complete black lines at the femora; tibiae black with two external yellow lines; tarsi black.

Abdomen moderately dilated at segments 1-2; 3-7 cylindrical, very slender; 8-10 rather considerably extended in lateral and dorsoventral dimensions, foliate dilatations of 8-9 large. Black with yellowish markings; dorsum of segment 1 except a narrow mid-dorsal line; segment 2 dorsolateral bands including a yellow mid-dorsal band, which is narrow in the anterior, broad in the posterior half; 3-7 longitudinal bands, very close to lateral margin, narrowly interrupted at anterior end, dorsally projecting at anterior carina and dilated to form a complete ring at the end of each segment; a narrow mid-dorsal line slightly dilated at the anterior carina, more dilated near the

terminal ring; on segments 3-4 two separate points instead of this latter dilation. Segments 8-9 reddish ochreous; broad slightly diffuse and sinuate latero-dorsal blackish bands; margin of foliaceous dilatations narrowly lined with black. Segment 10 reddish ochreous, dorsally obscure at base. Appendages (Text-fig. 52)—

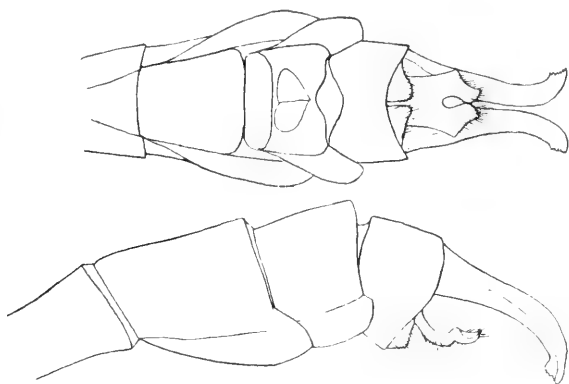


FIG. 52.—*Mesogomphus cognatus*, ♂. M'Fongosi. Terminal segments, ventral and left side view.

superiors reddish ochreous in proximal, blackish in distal half, inferior reddish ochreous. Genital organs of second segment, Text-fig. 53.

Wings hyaline. Costa lined with yellow to base of pterostigma, other venation dark. Pterostigma very dark ferruginous to almost black.

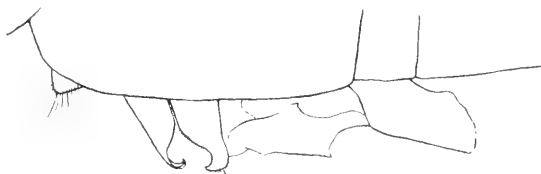


FIG. 53.—*Mesogomphus cognatus*, ♂. M'Fongosi. Genitals, second segment, left side view.

♀. Very similar to male in colour; structure of head much the same. Abdomen rather robust, extension of terminal segments comparatively slight, foliaceous dilatations of segments 8-9 very small. Groove on ventral plate of segment 9 large (similar to *M. Hageni*); vulvar scale scarcely more than one-third the length of segment 9, broadly excised to about one-half its length (none of the

specimens examined is in sufficiently good condition for a drawing). Appendages long and fine, sharply pointed.

♂, *Abd.* 28+3, *hdw.* 24, *pt.* 3 mm. (Waterval) Transvaal; 26+<3, 22, 3 (M'Fongosi), Zululand; 27+>3, 23, 3 (Harrar). ♀, 32, 28, <3 (Kapiri); 32, 28, 3.5 (Waterval).

### CRENIGOMPHUS (Sélys, 1892).

A small genus, originally established for two Abyssinian species. It does not seem to be separated by very important characters from the group here united under *Mesogomphus*. In case of a fusion of the two genera the name *Crenigomphus* would have priority.

#### CRENIGOMPHUS HARTMANNI (Forster, 1898).

S. Afr. Mus.: 3♂, 5♀, 1♂♀, *in cop.*, M'Fongosi, Zululand (iii, iv, v, xi, xii. 1911, W. E. Jones).

Colour light greenish yellow and dull ferruginous, the latter colour deeper and better defined than in *M. Hageni* and *elpidius*, but not so deep as in *cognatus*.

♂. Labium whitish yellow. Labrum, face and frons very light greenish yellow. On anterior ridge of frons a narrow brownish stripe not reaching quite to the lateral ends and behind 1-3 irregular rows of black granulations.

Occipital plate and upper surface of vertex duller yellowish than frons. Anterior surface of vertex across the ocelli and base of frons rather broadly brown. Free margin of occipital plate very slightly convex, lined with short yellow hair; on the anterior surface a low round convexity. On upper surface of vertex a transverse furrow near the fronto-occipital suture, the surface ascending from the furrow to a blunt anterior ridge, which, concave in the median line, projects slightly over each lateral ocellus. Thoracic pattern, Plate IX, fig. 5. Legs light yellow; spines, claws and internal side of tarsi black, merest trace of dark lines on tibiae and femora.

Abdominal segments 1 and 2 very moderately dilated; 3-6 rather robust, cylindrical; from middle of 7 gradually dilated to 10, strongly in lateral, less in dorsoventral dimension; tenth segment broadest in both dimensions; foliaceous dilatations of 8-9 moderate. Segments 1-7 rather pure yellow, a shade olivaceous; 8-10 reddish yellow; markings almost black; most of dorsum in segment 1; longitudinal dorsal band on 2 divided by a very narrow mid-dorsal line; 3-6 narrow line at anterior carina and round spot on the last third of dorsum, fused to a terminal ring; lateral longitudinal stripe, narrowly

interrupted at anterior end of each segment; 7 with analogous marking, but no line at anterior and lateral stripe narrower; 8-10 dark on dorsum, with a mid-dorsal light band, complete, narrow and parallel on 8, contracted to a point anteriorly and dilated posteriorly

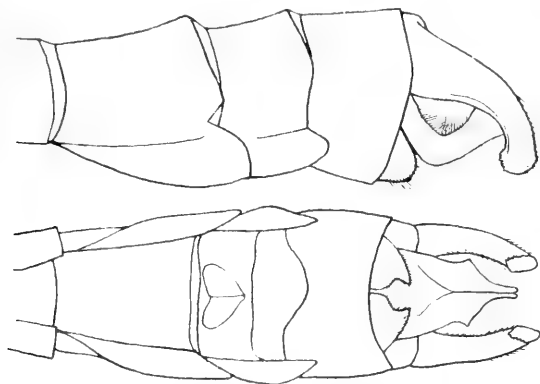


FIG. 54.—*Crenigomphus hartmanni*, ♂. M'Fongosi. Terminal segments, ventral and left side view.

on 9 and 10. Foliaceous dilatations of 8-9 light ferruginous, broadly lined with black. Appendages light yellow, only the extreme tip of the superior blackish (Text-fig. 54). Genital organs of second segment, Text-fig. 55.

Wings rather deeply tinged with yellow, more in the distal half.

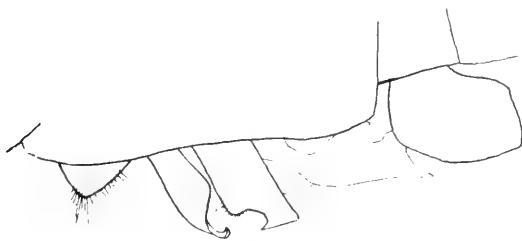


FIG. 55.—*Crenigomphus hartmanni*, ♂. M'Fongosi. Genitals, second segment, left side view.

Costa conspicuously yellow to apex, in sharp contrast to the deep black pterostigma; great part of venation in costal and proximal half of wings ferruginous.

♀. Free margin of occipital plate with a round median projection and on each side with 5 strong black spines. Dorsal surface of vertex divided longitudinally by a deep groove, which begins over the

median ocellus, being about the breadth of the ocellus, and ends posteriorly in a point near the transverse furrow (evidently in copulation the point of the inferior appendage of male fits exactly into this groove). Dark markings of abdomen considerably reduced; terminal spots shorter, pointed anteriorly; lateral stripes very narrow, rather widely distant from the margins. Segments 8-9 but little

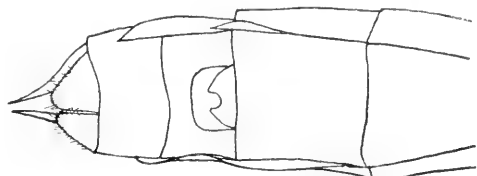


FIG. 56.—*Crenigomphus hartmanni*, ♀. M'Fongosi. Terminal segments, ventral view.

different from male, foliaceous dilatations only slightly narrower. Tenth segment narrow and short; appendages slightly longer, fine, sharply pointed. Groove on ventral plate of segment 9 small; vulvar scale small, triangular, excised (Text-fig. 56). Wings as in male.

♂, *Abd.* 30+2.5, *hdw.* 28, *pt.* 4 mm. ♀, 35, 30, 4.5.

#### ONYCHOGOMPHUS (Sélys, 1854).

A genus containing numerous palaearctic and oriental species. Of the African species formerly attributed to *Onychogomphus*, the majority are not quite homogeneous and will eventually pass to *Mesogomphus*.

#### ONYCHOGOMPHUS SUPINUS (Sélys, 1854).

S. Afr. Mus.: 1 ♂, Barberton, Transvaal (xi. 1918); 1 ♀, Kranzkop (21. xii. 1908); 1 ♀, M'Fongosi, Zululand (xi. 1911, W. E. Jones).

Light yellow and deep black.

♂. Labium light yellow, margin of median lobe and tips of lateral lobes blackish. Labrum, face and frons yellow; base of labrum narrowly black; a black transverse line on the median part of the fronto-nasal suture, which line crosses laterally over the postclypeus almost to its lateral inferior angles. Basal half of dorsal surface of frons black; two lateral irregular groups of black granulations near the anterior ridge. Vertex blackish, except the ridge over the ocelli, which is yellow. Occipital plate yellow, narrowly lined with black at the free margin; free margin almost straight, with long black hair.

Vertex joining the occipital plate in an obtuse angle, almost plain and horizontal, forming an obtuse ridge above the ocelli. Thoracic pattern Plate IX, fig. 6. Legs yellow, femora with two black lines, internal side of tibiae and tarsi black.

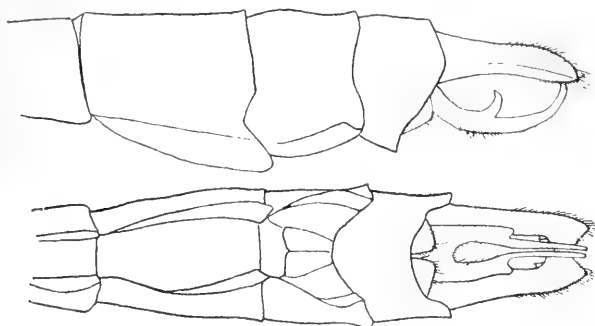


FIG. 57.—*Onychogomphus supinus*, ♂. Barberton. Terminal segments, ventral and left side view.

Abdominal segments 1-2 moderately dilated, 3-6 cylindrical, rather robust, posterior half of 7 to 9 gradually dilated, 10 slightly narrower than 9; lateral margin of 8-9 moderately foliaceous. Yellow, with black markings on segment 2, broad dorsolateral bands, and narrow lines at anterior joint and transverse carina; 3-7 lateral bands, distant from lateral margin by slightly less than their own breadth, narrowly

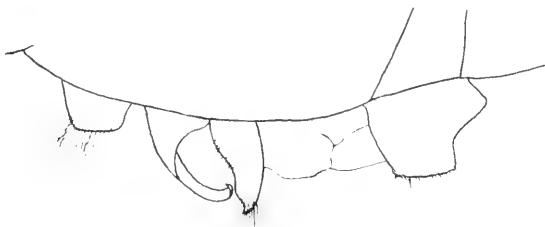


FIG. 58.—*Onychogomphus supinus*, ♂. Barberton. Genitals, second segment, left side view.

interrupted at anterior end, and dorsally dilated at transverse carina and posterior third of each segment; complete narrow black rings at the end of each segment; 8-9 ferruginous, yellowish at the sides, a dorsal blackish mark on anterior half interrupted on 8 by a sinuate yellow spot, on 9 by two yellow points; foliate dilatations black; 10 black on basal third, yellow posteriorly.

Appendages (Text-fig. 57), superior yellow, inferior black. Genital organs of second segment, Text-fig. 58.

Wings hyaline, costal vein lined with yellow in front. Venation partly ferruginous in basal and costal part of wing. Pterostigma light yellow between thick black veins.

♀. Similar to male, black markings somewhat reduced; black on labrum indistinct, absent on postclypeus; black markings on abdomen comparatively narrower throughout, absent on tenth segment. Appendages and supra-anal tubercle yellow. On free margin of occipital plate two strong spines directed forward and laterally; on anterior surface of plate a small rounded tubercle; vertex as in male. Abdominal segments 7-10 but moderately extended; no foliaceous dilatations on 8-9. Groove on ventral plate of 9 comparatively small; vulvar scale broadly triangular, excised (Text-fig. 59). Appendages comparatively short and robust. Wings slightly tinged with yellow in sub-costal and cubito-anal space.

♂, *Abd.* 31 + 2.5, *hdw.* 28, *pt.* < 4 mm. ♀, 34, 30, 4.

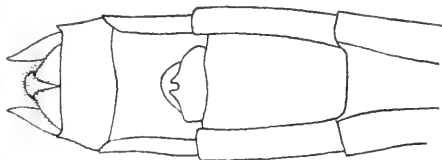


FIG. 59.—*Onychogomphus supinus*, ♀. Kranspoort. Terminal segments, ventral view.

(a) A female from M'Fongosi, Zululand (xii. 1911, W. E. Jones) agrees in most characters with the other specimen from this locality, but differs in the following points: (1) Pterostigma almost black, turning to brown only at posterior margin; (2) wings tinged with yellow all over to half-way from base to nodus in costal and sub-costal space, to the triangle in cubito-anal space; (3) vulvar scale more broadly and deeply excised.

Of the occipital spines only the left one is developed, the right one indicated by a rudiment. *Abd.* 33, *hdw.* 29, *pt.* 3 mm. This specimen might belong to a distinct species, but in absence of the male it would not be safe to accept this view.

#### CERATOGOMPHUS (Selys, 1854).

This genus was established for the single species here described, which is rather widely different from *Onychogomphus* in its male appendages and female genital segments, though the affinity is clearly indicated by the neural characters.



## CERATOGOMPHUS PICTUS (Sclys, 1854).

S. Afr. Mus.: 1 ♂, 1 ♀, Dunbrody (11. x, 6. iii, 1912); 1 ♀, Waterval (ii, x. 1900). Brit. Mus.: 1 ♂, Salisbury (xi. 1905, Marshall); 1 ♀, S. Africa (very old specimen). Coll. K. J. Morton: 1 ♀, King Williamstown, Cape (4. i. 1908, Miss Fountaine); 1 ♀, Stutterheim, Cape (7. i. 1908, ead). Coll. E. B. Williamson: 2 ♀, Princetown, Natal (28. i. 12. ii. 1909, G. F. Leigh). Coll. Ris: 1 ♀, Botchabelo, 1200 m. (20. ii. 1914, H. Junod).

Yellow at the sides of thorax with a greenish shade; markings sharply defined, black, dark reddish-brown on thorax.

♂. No male in good condition for a description or drawing of structural details was available.

♀. Labium whitish, tips of lateral lobes blackish. Labrum, base of mandibles, genae whitish; face and frons yellow, the following markings black; transverse line on suture of labrum and anteclypeus; narrow sinuate line on anterior margin of postclypeus; narrow line on nasofrontal suture. Dorsal surface of frons yellow, broadly black at base; vertex black with a transversely oblong, dull yellowish spot at the ocelli; occipital plate yellow, narrowly lined with black at free margin. This margin slightly convex with a row of numerous, robust, slightly irregular black spines; anterior surface slightly concave with a low, transversely oblong central tubercle. Vertex at occipital suture slightly convex, transversely rugose; more forward a shallow transverse furrow and then a very slightly concave plane, ending in a sharp transverse ridge over the ocelli. Thoracic pattern Plate IX, fig. 7.

Legs very robust, longer than in preceding species of *Onychogomphus* and *Mesogomphus*, the end of third femora just reaching the joint of thorax and abdomen; femora yellow with black lines, incomplete on third femora; tibiae black with yellow external lines; tarsi black.

Abdominal segments 1-2 moderately extended, 3-8 comparatively robust, cylindrical, 9-10 narrowed. Lateral margins of 8 with broad foliaceous dilatations; similar dilatations only just indicated on 9. Yellow, with black markings; dorsolateral bands on segment 2, which include a trilobate median yellow band; 3-7 lateral bands, interrupted at anterior end of each segment, including a small yellow spot at each posterior end; narrow terminal ring; mid-dorsal line narrowed posteriorly and slightly dilated at transverse carina. On segment 8 lateral bands dilated in middle to touch each other in mid-dorsal line; foliaceous dilatations yellow; 9 yellow, mid-dorsal line and incomplete transverse band in middle black; 10 black with

three yellow points. Appendages and supra-anal tubercle yellow. Ventral surface of abdomen whitish.

For vulvar scale and other structures of genital segments see p. 340, and Text-fig. 60.

Wings slightly tinged with yellowish, especially along the veins. Costal vein, costal and subcostal cross-veins yellow. Pterostigma black.

*Abd.* 40, *hdw.* 32, *pt.* 3.5 mm.

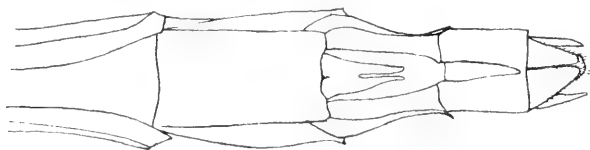


FIG. 60.—*Ceratogomphus pictus*, ♀. Waterval. Terminal segments, ventral view.

The anal loop as described in the table (p. 340), and figured in Plate VIII, fig. 6, is sometimes not fully developed, the transverse veins failing to meet exactly for the formation of its anal side. Such specimens may easily be identified by the structure of the terminal segments, which is very characteristic in both sexes.

## II CB. SUBFAMILY AESCHNINAE.

The largest and most conspicuous *Odonata* of South Africa (and most other regions) are the *Aeschninae*. Everybody, not the entomologist alone, knows the beautifully built, gaily coloured giants of the Order. Their restless hunting of insect prey over every sheet of water as long as there is bright sunshine, their swift movements and keen evolutions never fail to attract the interest and the delight of a thoughtful observer. But what means beauty and delight to the unselfish spectator is often delusion and bitterness to the collecting entomologist, who may observe a great prize for hours without having the chance to get it into his treacherous net. Only a few members of the subfamily are slower in their movements, less defiant, less attached to open water and therefore an easier prey among vegetation, sometimes far from water, in woods, gardens, even in towns. *Aeschninae* are the "dragonflies" in the restricted sense, and the numerous vernacular names in many languages nearly always mean some conspicuous *Aeschna* or *Anax* in preference to other members of the Order. It is difficult to say why these insects have in some regions (as, for instance, in the writer's Swiss home) a very

bad reputation with the people, as being highly dangerous to man and venomous stingers. But dangerous and terrible as they are to any flying insect up to a middle-sized dragonfly, they are utterly harmless to man, and incapable to do the least harm. The long abdomen is a steering apparatus in the mad flight, and the more or less pointed appendages at its end are, as we know, copulatory organs. No sting, no poison, not even a trace of smelling secretion is found either in this group, or any other in *Odonata*. There is a good representation of the genus *Anax* in the fauna under discussion; but otherwise the region appears poor in *Aeschninae*, though discovery of some other species is not improbable.

Larvae of *Aeschninae* (Plate XII, fig. 4) are of a rather uniform type throughout the subfamily. Body elongate, ventral side flat (as in all nymphs of *Anisoptera*), dorsal side convex to almost half-cylindrical shape.

Labium long and flat, its lateral lobes hook-like. Legs long and slender, not fossorial.

1. *Rs* forked proximal to pterostigma; more than two rows of cells between the branches. Between *Rs* and *Rspl* a uniform network of cells, also between *M*<sub>4</sub> and *Mspl*.  
Origin of *M*<sub>4</sub> in middle of arculus or slightly behind; origin of *M*<sub>13</sub> nearer to *M*<sub>4</sub> than to the costal end of arculus. Proximal anal margin of hind wing excised in male, with anal triangle. (Plate VIII, figs. 7, 8, 9) 2.  
*Rs* forked distally to middle of pterostigma, costal branch of fork continuing the main direction of sector; fork narrow with but two ranges of cells between the branches. Between *Rs* and *Rspl* a number of small additional sectors parallel and similar to anal branch of fork. Similar structures between *M*<sub>4</sub> and *Mspl*. Origin of *M*<sub>4</sub> in front of middle of arculus, of *M*<sub>13</sub> nearer to costal end of arculus than to origin of *M*<sub>4</sub>. Proximal anal margin of hind wing similar in both sexes, rounded, no distinct anal triangle. (Plate V, fig. 1.) No earlets at second abdominal segment of male. *M*<sub>2</sub> abruptly bent toward the costa in level of distal end of pterostigma . . . . . 4.
2. Frons and face comparatively broad, more than one-third of the transverse diameter of head. Anterior ridge of frons moderately convex, rounded. Eyes moderately large, their line of contact not much longer than length of dorsal surface of frons. Tenth ventral plate of female not projecting, covered with many fine denticles in distal half. Membranule large. (Plate VIII, figs. 8, 9.)  
Frons and face comparatively narrow, less than one-third of the transverse diameter of head. Anterior ridge of frons produced in an almost right angle. Eyes very large, their line of contact about twice the length of dorsal surface of frons. Abdomen very slender. Tenth ventral plate of female produced in two long, fine, ventrally curved spines. Membranule very small. (Plate VIII, fig. 7) . . . . *Gynacantha*.

3. Cells between  $R_s$  and  $M_3$  not distinctly arranged in rows. End of  $M_2$  slightly and gradually convex towards the costa. (Plate VIII, fig. 8) . *Aeschna*.  
Cells between  $R_s$  and  $M_3$ , in part at least, distinctly arranged in transverse rows, especially a regular supplementary sector in front of and parallel to  $M_3$ , distant by one row of cells.  $M_2$  convex towards the costa in a rather abrupt curve in level of distal end of pterostigma. (Plate VIII, fig. 9) . . . . . *Anaciaeschna*.
4.  $Cu_2$  in hind wing following the general direction of  $Cu_1$  throughout, in distal half running to wing's edge parallel to  $Cu_1$  and distant by one row of cells. A supplementary lateral keel on part of the abdominal segments, at least 7-9 . . . . . *Anax*.  
 $Cu_2$  in hind wing circumscribing with base of  $Cu_1$  a roughly quadrangular or circular field with three to four rows of cells, where it approaches  $Cu_1$  to run into parallel direction, but distinct recurrent branch (Plate V, fig. 1). No lateral keels on abdomen . . . . . *Hemianax*.

#### GYNACANTHA (Rambur, 1842).

A genus of circumtropical distribution. Some isolated species penetrate into higher latitudes in various regions. The two species here recorded are evidently outposts of tropical character and cannot be expected much farther south than the present records. Collectors' notes from far distant regions (Malayia and South America) mention crepuscular habits for at least part of the species, and from their colour system and perhaps also general stature one would deduce that the entire group consists of wood-loving insects. The facies of *Gynacantha* is quite peculiar—much more so than can be said in a few words—and an expert will scarcely ever fail to locate even a male (without the more characteristic female) at the first glance.

Comparatively large species: ♂ *abd.*, 56 + 6·5, *hbw.* 52, *pt.* 4 mm.; ♀, 55 + 5, 55, 4·5. More than 25 ante-cubital cross-veins in front wing. Superior appendages of male excised at internal margin, broadly cut at end.

*G. villosa*.

Much smaller species: ♂ *abd.*, 43 + 5, *hbw.* 36, *pt.* 25 mm.; ♀, 47 + 3, 39, < 3. About 15 ante-cubital cross-veins in front wing. Superior appendages of male not excised at internal margin, pointed . . . *G. manderica*.

#### GYNACANTHA VILLOSA (Grunberg, 1902).

Coll. Ris: 1 ♂, 1 ♀, Delagoa Bay (Junod).

This pair was identified in the Schultze paper as *G. bispina*, Ramb., from descriptions alone. I have examined since the types and other specimens of *bispina*, which is certainly distinct, whereas the description of *villosa* agrees perfectly.

♂ (adult, preservation of colours somewhat poor). Labium and

labrum dull ferruginous. Face and frons anteriorly olivaceous. Dorsal surface of frons olivaceous, passing into ferruginous medially, with a brownish-black T-spot; longitudinal part of T-spot narrow,

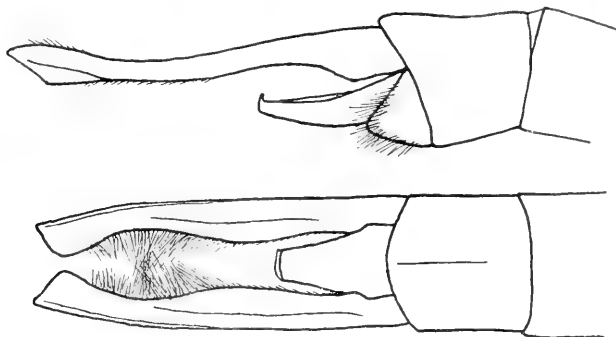


FIG. 61.—*Gynacantha villosa*, ♂. Delagoa Bay. Terminal segments, right side and dorsal view.

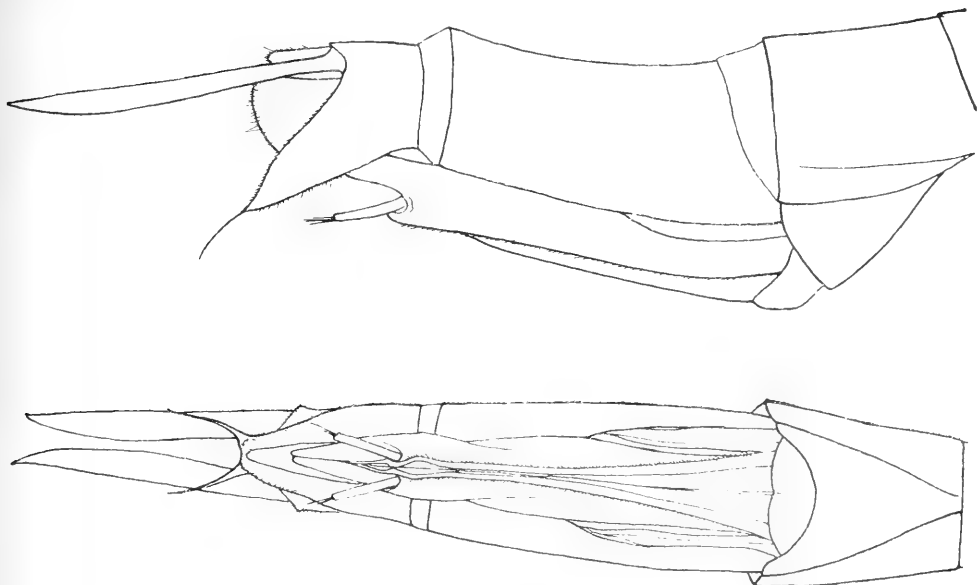


FIG. 62.—*Gynacantha villosa*, ♀. Delagoa Bay. Terminal segments, right side and ventral view.

transverse part filling up the anterior part of front, which is produced to form almost a right angle. Vertex blackish brown. Antennae light ferruginous. Occipital triangle very small, light yellow. Occiput

light greyish ochreous. Thorax short and robust, dorsum densely covered by minute granulations which get scarcer laterally, with dense and rather long greyish pubescence. Dorsum dark greyish brown with a distinct greenish shade; sides and ventral side gradually lighter. Metastigma black. Legs uniform light ferruginous.

Abdominal segments 1-2 moderately enlarged in lateral, very little in dorsoventral dimension; 3 moderately contracted, end of 3-10 almost cylindrical, slender. Earlets of second segment moderate, cut straight with 6 rather robust denticles. Abdomen dull ferruginous, joints and carinae narrowly blackish; no distinct markings (destroyed?). Appendages, Text-fig. 61.

Wings irregularly tinged with greyish yellow (as nearly always in fully mature specimens of *Gynacantha*); sub-costal and cubito-anal space yellowish at base, this colour not deep and rather indistinct. Pterostigma dull ochreous. Venation much denser than in following species (fig. 13 in the Schultze paper).

♀. Very similar to male in colour, somewhat lighter (not so mature). Abdomen more robust, less contracted at third segment. Ovipositor very long and robust, and consequently the ninth segment elongate (6 mm.) and also dilated in dorsoventral dimension (Text-fig. 62).

#### GYNACANTHA MANDERICA (Grunberg, 1902).

Coll. E. B. Williamson: 1 ♂, Salisbury, Mashonaland (ii. 1900, Marshall). Mus. Tervueren: 1 ♀, Kitompo Fungwe (18. vi. 1911, Dr. Bequaert).

A very distinct species, resembling by its comparatively short and broad wings and small size a type represented by the Asiatic species *G. bayadera*, Sclys. It is the smallest of known African *Gynacanthæ*.

♂. Labium and labrum ochreous. Face and frons anteriorly olivaceous. Dorsal surface of frons ochreous in basal half, turning gradually to olivaceous anteriorly. T-spot deep brown, longitudinal part broad, lined by a very narrow light yellowish line; transverse part reduced to a rather small, almost rhomboid dilatation. Thorax greyish olivaceous; dorsum finely granulate, with rather long, fine, whitish hair; a few blackish-brown markings; a round point near the dorsal end of humeral and second lateral suture, traces at the ventral sutures and a transversely triangular spot on metasternum. Legs short. Femora ferruginous, very slightly and gradually darker at distal end; tibiae black internally, light ochreous externally; tarsi black.

Abdominal segments 1-2 considerably dilated, base of 3 much

contracted, end of 3 to 10 cylindrical, slender. Earlets of second segment large, rounded, with 7-8 strong denticles. (Colours not in very good condition.) Segment 1 light ochreous, greyish olivaceous in posterior half of dorsum; 2 light ochreous at sides, olivaceous in anterior, light blue (probably a very distinct mark in the living insect) in posterior half of dorsum; 3-8 dull ferruginous, with a black line at transverse carina, and behind the carina a blackish-brown dorsolateral spot, which increases gradually from the third to the eighth segment, and includes on each side a terminal, roughly triangular dull ochreous spot; 9-10 ochreous with mid-dorsal blackish band. Superior appendages deep black, inferior light yellow; superior lanceolate, not excised internally, with a not very dense row of fine black ciliae at internal margin, produced into a slender and very acute point; inferior one triangular, obtuse, between one-third and one-half the length of the superior, not in good condition for a drawing, agreeing well with R. Martin's figure.

Wings hyaline, reticulation in costal and basal part greyish ochreous; costa light ochreous. Brown, fumose basal mark along the veins in costal, sub-costal and cubito-anal space to first cross-vein. Pterostigma greyish ochreous between black veins. Neuration, Plate VIII, fig. 7.

♀. Very similar to male. No blue on second abdominal segment; dark dorsal spots of following segments smaller and not so deep in colour. Ninth segment moderate (3 mm.); ovipositor similar in structure, but much less developed in dimensions than in *G. villosa*.

#### AESCHNA (Fabricius, 1775, *emend.*).

A large cosmopolitan genus, not fully homogeneous, most species belonging to the temperate regions of the Northern hemisphere. African species are not numerous. Of our two species one (*minuscula*) is of uncertain affinities; the other (*subpupillata*) is representative of a group otherwise known from tropical East Africa.

Larger species. On superior surface of frons an oculate mark; black median basal spot surrounded by light yellow and then by bluish grey. Genital lobe in second segment of male much produced. *A. subpupillata*. Smaller species. On superior surface of frons a T-spot with broadly triangular base and broad, crescentic horizontal part along anterior frontal ridge. Genital lobe of male not produced. . . . *A. minuscula*.

#### AESCHNA SUBPUPILLATA (MacLachlan, 1895).

Coll. K. J. Morton: 1 ♂, 1 ♀, Stutterheim, Cape Colony (9, 14. i. 1908, Miss Fountaine).

♂. Labium light ochreous. Labrum, face and frons anteriorly very light greenish yellow; a very narrow and incomplete black line at base of labrum. On dorsal surface of frons a black basal band, narrowly descending along the eyes; fused to that band an almost circular black spot; rather widely separated from this spot a narrow black line on anterior frontal ridge; the black basal spot surrounded by a narrow light yellow line, which is limited anteriorly by the black line on frontal ridge, laterally by greyish blue shades, which do not fully reach the basal black band. Vertex yellow above, black in front. Occipital triangle yellow. Occiput ferruginous with black margin. Thorax dull olivaceous brown, with light yellow markings; narrow ante-humeral bands to about mid-height, slightly nearer to median than to humeral suture; transverse spot in angle between alar sinus and dorsal end of humeral suture; humeral suture narrowly lined with ochreous; two almost equally broad (1 mm.) lateral bands, passing from light yellow to more greenish shades dorsally, distinctly lined with dark brown in ventral half; first band in middle of mesepimeron, bent at mid-height to more nearly vertical direction; second band on middle of metepimeron, slightly widened dorsally and slightly concave anteriorly; a triangular metepisternal spot behind dorsal half of mesepimeral band. Metasterna dark brown with two small yellow spots. Legs robust; femora ferruginous, black at the joints; internal side of first pair light yellow; tibiae and tarsi black.

Abdominal segments 1-2 moderately inflated, 3 considerably contracted, end of 3 to 10 robust with parallel sides. Colour of living insect probably green (or blue) and dark brown in about equal parts, in dead and discoloured specimen dull olivaceous and dull brownish ferruginous. Light (green?) colour distributed as follows: sides of segment 1; complete basal ring on 2, to transverse carina, laterally to the earlets; 3 large mid-dorsal anterior spot to transverse carina, two small triangular spots behind carina, large terminal, lateral, semicircular spots, touching at mid-dorsal line; 4-7 complete basal ring to carina, behind carina each side two median spots, the larger one lateral, the smaller one dorsal, and a semicircular terminal spot; 8 small lateral anterior and large semicircular terminal spot; 9 the semicircular terminal spots alone; 10 ferruginous on anterior, light green on posterior half, the two colours separated by a narrow black line, which is continued posteriorly on the mid-dorsal carina. Ventral surface blackish, second segment dull brown, and also basal lateral small spots on segments 4-8. On first ventral plate a transverse, anteriorly convex field covered with numerous small black spinules. Earlets of second segment small with three dorsally directed spines. Margin of



genital pocket posteriorly (posterior genital lobe) projecting in a long obtuse lobe, which projects ventrally considerably beyond the general outline of abdomen; lobes of both sides touching in median line. On the anterior lamina two long and acute horizontal spines directed backwards; hamuli small (not clearly visible).

Mid-dorsal carina of tenth segment raised in a short tooth in middle of length, obsolete in posterior half, accompanied by one or two slight folds on each side. Appendages (Text-fig. 63) dark reddish brown.

Wings hyaline; costal vein yellow anteriorly, cross-veins in basal and costal part yellowish to nodus, triangle and base of *Cu*. Membranule dull brown, rather broadly whitish at base. Pterostigma very light ferruginous. Reticulation, Plate VIII, fig. 8.

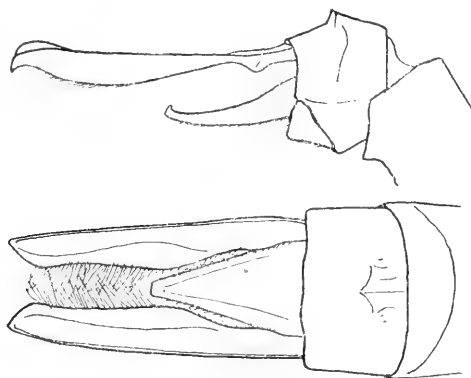


FIG. 63.—*Aeschna subpupillata*, ♂. Stutterheim. Terminal segments, right side and dorsal views.

♀. Labium and labrum darker ferruginous; face and frons anteriorly dull ferruginous with a shade of olivaceous. Frons above as in male. Thorax and abdomen as in male, but dark part of pattern lighter and light parts slightly more extended (discoloured in our specimen); basal dorsal spots present on segment 8 and basal lateral ones joined to terminal spots; 9 light coloured entirely, except a narrow, slightly sinuous transverse anterior line. Ventral plate of first segment as in male; terminal half of tenth ventral plate densely covered with small black spinules. Valvae obtuse, projecting little beyond end of abdomen. Wings as in male; membranule whitish in basal, grey in apical half.

♂, *Abd.* 42 + 5, *hdw.* 40, *pt.* 35 mm. ♀, 44 + 4.5, 43, 35.

This pair agrees well with MacLachlan's original description of *A. subpupillata*, but almost as well with Calvert's (earlier) and

Sjöstedt's (later) descriptions of *A. Rileyi*. Nevertheless the present specimens are smaller than the smallest dimensions given for *A. Rileyi*, and I have before me a single female (head lost) of an *Aeschna* from Kapiri, Katanga (Mus. Tervueren, collector Legros, x. 1912), which seems to be specifically distinct from the pair above described and may be the true *A. Rileyi*.

It differs by the following points: (1) Considerably larger (*abd.* 51 + 5, *hdw.* 50, *pt.* 4), and much more robust in thorax and abdomen; (2) lateral bands of thorax narrower, ochreous line at humeral suture and yellow transverse mark in front of antealar sinus absent; (3) membranule wholly dark grey.

#### AESCHNA MINUSCULA (MacLachlan, 1895).

S. Afr. Mus.: 2 ♀ (old specimens, not dated); 1 ♀, M'Fongosi, Zululand (i. 1912, W. E. Jones); Nurugas, Tsintsabis, and Otjiwarongo, S.W. Protectorate (i. 1920, Tucker).

♀. Labium ochreous. Labrum, face and frons anteriorly dull ferruginous. Postclypeus laterally, frons laterally and above light yellow. A narrow black line at base of frons, descending along the eyes; broadly fused to this line a medial black spot, abruptly contracted anteriorly to join a transverse black line on the frontal ridge, thus forming a T-shaped spot. Vertex yellow above, black in front. Occipital triangle light yellow; occiput black. Thorax light golden brown. Yellowish green, narrow, almost complete ante-humeral bands, nearer the median than humeral suture, slightly convergent dorsally. Two very broad (1.5 mm.) lateral bands yellow, shading to greenish dorsally, lined with darker colour in ventral half; anterior one in middle of mesepimeron, posterior one slightly in front of middle of metepimeron. Legs black, basal half of femora ferruginous.

Abdominal segments 1-2 much inflated, 3-5 gradually contracted, 6-10 cylindrical. Ferruginous with light yellow and blackish markings: broad latero-ventral longitudinal bands on segments 1-2, narrow mid-dorsal line on 2; 3-8 basal ventral spot of nearly one-half the breadth and two-thirds the length of each segment, this spot pointed behind and narrowly lined with black on ventral, broadly on dorsal side, yellow; 3-7 small yellow spot behind transverse carina; the carina lined with black; 9 latero-dorsal, triangular yellow spots pointed posteriorly; 10 yellow, except a narrow dark median and basal line. Appendages very short, ferruginous. Posterior half of tenth ventral plate densely covered with minute black spines. Valvae obtuse, short, projecting but little behind the end of tenth segment

(Text-fig. 64). On first ventral plate a flat transverse tubercle covered with minute spinules.

Wings rather rich golden yellow in basal and costal half to distal end of pterostigma. Pterostigma light ochreous.

Membranule white in proximal, blackish in distal half. Costa light yellow; cross-veins to nodus, triangle and *Cu* light yellow. Venation as in *A. subpupillata* in all essential points.

♀, *Abd.* 42 + 2, *hdw.* 39, *pt.* < 4 mm.

MacLachlan's original description agrees perfectly with our specimens, only the wings of the typical pair are hyaline and not yellow; but in a note another female with "wings much tinged with yellowish" is mentioned as "possibly a distinct species." The (later) description

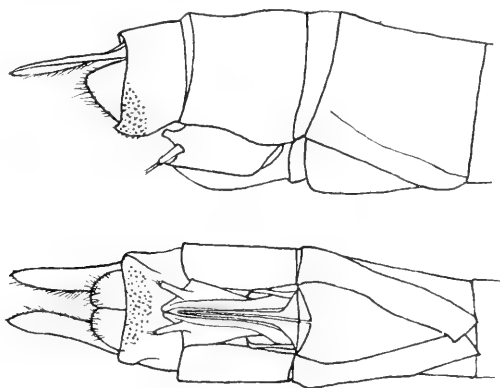


FIG. 64.—*Aeschna minuscula*, ♀. Cape. Terminal segments, right side and ventral view.

of *A. dolabrata* by Karsch agrees also with our specimens so well that I strongly suspect this species to be the same as MacLachlan's.

#### ANACIAESCHNA (Sclys, 1878).

The genus was originally founded for a single widely distributed and common species, *A. jaspidea*, Burm., which ranges from India to Polynesia, but has not yet been observed in Africa. From this continent a second species was described by MacLachlan from Delagoa Bay; it is evidently less common than *jaspidea* seems to be in its haunts. Our description is taken from an Abyssinian specimen, which agrees with the original description in all essential points. The definition and name of the genus were originally taken from the presence of accessory lateral carinae in the abdomen of *A. jaspidea*. But I find these carinae often indistinct in the female of *jaspidea*, and

altogether absent in the female of *triangulifera*. Therefore I preferred to omit this character from the definition and base it on neural characters.

*ANACIAESCHNA TRIANGULIFERA* (MacLachlan, 1895).

Coll. Ris: 1 ♀, Camp Hardim, River Hawark, Harrar, Abyssinia (x-xii. 1910, Kristensen).

♀ (slightly immature). Labium and labrum dull ferruginous. Face and frons anteriorly olivaceous, laterally light yellow. Frons above light yellow with dark brown markings; broad triangular basal spot, reaching laterally to slightly beyond the base of antennae, broadly fused to a line on anterior ridge, this ridge slightly produced in an obtuse angle. Vertex blackish, with two round yellow spots above. Thorax dark brownish grey, no ante-humeral lines. Sides with two equal, straight, parallel, rather narrow ( $< 1$  mm.) light yellow bands; anterior one obliquely crossing mesepimeron, distant at ventral end by about its own breadth from humeral suture, ending dorsally half way between humeral and second lateral suture; posterior one crossing obliquely metepimeron, distant at ventral end by less, at dorsal end by more than its own breadth from second lateral suture; a small mesinfraepisternal yellow spot. Legs black, extreme base of first femora yellow internally.

Abdominal segments 1-2 much inflated, spherical; base of segment 3 much contracted, the rest relatively long and slender. Dark ferruginous, shading to grey, with blackish and light yellow markings. Blackish: terminal joints of segments rather broadly, transverse carinae narrowly and a diffuse lining of the single yellow spots. Light yellow: a transverse posterior line on segment 1, narrowing dorsally; complete, narrow ( $< 1$  mm.) longitudinal lateral band on segment 2, very narrow transverse line in front of carina of 2, dilated in mid-dorsal line; 3-7 small round spot behind ventral end of transverse carina and narrow transversely triangular spot at dorsal end of same; 8 small latero-anterior spots; 9-10 sides broadly ochreous. Ventral side dull brown, base of 3 greyish yellow, 4-7 small basal yellowish spots. Valvae with a small, very acute spine at ventral angle. Terminal third of tenth ventral plate densely covered with minute black spines.

Appendages narrow, foliaceous, obtuse.

Wings hyaline, very light yellow at base in sub-costal and cubito-anal space. Costa light yellow. Pterostigma ochreous. Membranule white in proximal, dark grey in distal half. Venation, Plate VIII, fig. 9.

♀, *Abd.* 48 + 4.5, *hdw.* 43, *pt.* 3.5 mm.

## ANAX (Leach, 1815).

A cosmopolitan genus of large, strongly built and beautifully coloured species, more numerous in the Old than in the New World, some of them very widely distributed.

Probably *Anax* is of typical origin, and has spread to higher latitudes as a result of migratory power and facility of adaptation to various conditions of environment, and on the assumption that a sufficiently high water temperature is available in the period of larval development. The writer's observations of *Anax imperator* in Switzerland seem to indicate that this development is comparatively rapid, being completed in one year, whereas *Aeschna* nymphs, as observed by Dr. Walker in Toronto, Canada, by Dr. Wesenberg-Lund in Hilleroed, Denmark, and by the writer in his Swiss home, need two, or even three and more years to complete their larval life. *Anax* larvae, as far as known, are living in the open water of ponds and small lakes amongst aquatic vegetation and are consequently of the transparent type, vividly coloured green or yellowish and with a highly cryptic pattern. There is evidence that this mode of living in standing water applies also to some of the most widely distributed Odonata of various systematic groups (*Enallagma cyathigerum*, *Anax imperator* and *junius*, *Pantala flavescens*, *Tramea limbata*). The conditions of environment are very much the same for this type of larvae all over the world, checks to be found only in the low temperature and in the competition of other species of their own kind. The phenomenon seems a parallel to the world-wide distribution of the aquatic plants themselves, among which those larvae pass their existence. *Anax* larvae are very swift in movements and voracious feeders, as shown by their rapid growth.

1. Thorax light green. No red colour . . . . . 2.  
 Thorax brick red, with a greenish shade at the sides. Most of the body venation and pterostigma brick red. Frons immaculate . *A. speratus*.
2. Abdomen in male light blue with a mid-dorsal sinuate, longitudinal black band; in female green with the mid-dorsal band ferruginous to brown. Frons with a broadly lanceolate or rounded basal black spot and a light blue or greyish transverse band at anterior ridge  
*A. imperator mauricianus*.  
 Abdomen mostly black with small light green spots . . . . . 3.
3. Very large species, with enormously long abdomen in male. Base of hind wings with a dark brown spot at the membranule. Frons with a broadly triangular basal black spot . . . . . *A. tristis*.  
 Much smaller species. No blackish-brown spot at base of hind wings. Frons with triangular black marks at base and anterior ridge, the two spots narrowly fused . . . . . *A. georgius*.

## ANAX SPERATUS (Hagen, 1867).

S. Afr. Mus.: 1 ♂, Rietfontein (19 . x . 1904); 3 ♂, M'Fongosi, Zululand (iii, x, xii . 1911, W. E. Jones); 1 ♂, Umhlali, Natal (i . 1913, K. H. Barnard); Acornhoek, Transvaal (xii . 1918, Tucker). Coll. E. B. Williamson: 1 ♀, Hilton Road, Natal (19 . xii . 1909, G. F. Leigh). Mus. Tervueren: 1 ♀, Baudouinville (30 . iii . 1911, B. Valdonis). Mus. Stockholm: 1 ♀, Congo, 1 ♀, Mukimbungu, Congo (Laman). Mus. Hamburg: 2 ♂, Nguelo, Usambara. Coll. Ris: 1 ♂, Abyssinia; 1 ♂, Harrar, Abyssinia (1911, Kristensen). Coll. Petersen-Silkeborg: 1 ♀, Asmara, Eritrea (1907, Kristensen).

♂. Lips, face and frons ferruginous, with a very slight greenish shade in some specimens. Thorax brick red, also with a trace of greenish at the sides; latero-ventral sutures with black dots. Legs very long and robust; femora ferruginous, tibiae and tarsi black. Abdomen, the appendages included, brick red, first to second segment faintly greenish laterally. Superior appendages spatulate; median border produced as a broad triangle with point in middle of length; end of appendage an almost circular plate with anterior median border sharply upturned. Inferior appendage half as long as superiors, slightly narrowed distally and shallowly excised at end. Wings hyaline, base light yellow from the costa to vein *A* and to about half way to arculus; venation light brick red in basal and costal part, gradually turning to darker brown towards apical and anal margin; pterostigma brick red; membranule white in proximal, dark grey in distal half.

♀. Similar to male in colour; but the greenish shade much more developed on the thorax, sides of first and second abdominal segment decidedly greenish. Appendages simple, broadly lanceolate. Wings tinged with yellow in the costal part to almost the level of *M*<sub>4</sub>.

♂, *Abd.* 50 + 7, *hdw.* 53, *pt.* 5 mm. ♂, 58 + 6, 59, 5·5.

This *Anax* must be, in the full beauty of living colour, a most conspicuous and elegant insect. Its colour system has analogous though not identical representatives in the Oriental *A. immaculifrons* and the American *A. longipes*.

## ANAX IMPERATOR MAURICIANUS (Rambur, 1842).

S. Afr. Mus.: 1 ♂, Waterberg, Zoutpansberg Distr. (20 . x . 1901); 1 ♂, Salisbury, Mashonaland (17 . xii . 1911); 1 ♂, 1 ♀, Lorenzo Marques (24, 27 . ix . 1911). Coll. K. J. Morton: 1 ♂, Dargle, Natal (i, ii . 1909, Miss Fountaine). Coll. E. B. Williamson: 2 ♂, Salisbury

(ii, iii. 1900, Marshall). Coll. Ris: 3 ♂, Delagoa Bay (H. Junod); 1 ♀, Lorenzo Marques (29. xi. 1911); 1 ♂, 1 ♀, Harrar, Abyssinia (1911, Kristensen). Mus. Stockholm: 1 ♂, Madagascar. Mus. Hamburg: 1 ♂, Nguelo, Usambara; 1 ♀, Chiroma, Brit. E. Africa; 1 ♀, Nossi Be; 1 ♂, 1 ♀, Mauritius (Robilliard).

♂. Labium and labrum yellowish. Face and frons light green. On base of frons a narrow black line, descending very narrowly along the eyes, broadly fused to a black median spot, which is individually variable in outline, more rounded, or broadly lanceolate, more or less pointed anteriorly; along anterior ridge of frons a broad band somewhat variable in colour between bluish grey and almost pure blue. Thorax pure light green, the latero-ventral sutures lined with blackish. Legs long and robust, black, basal half of second, two-thirds of third femora ferruginous, gradually passing to black distally; interior side of first femora whitish yellow. Abdomen light green on first and basal third of second segment, otherwise light sky blue; from segment 2 to 10 a mid-dorsal black band, sinuate by dilatations at transverse carinae and in posterior third of segments 3-7; lateral margins and supplementary carinae narrowly lined with black. Appendages black, ventral side of inferior one ochreous; superiors very slightly convex laterally, strongly convex medially, rounded at the ends; densely covered with long greyish pubescence in distal half of median margin; inferior about two-fifths the length of superiors, very little narrowed to end, the end slightly upturned and very shallowly emarginate. Wings very slightly tinged with greyish yellow from the triangles outward. Costal vein light yellow; pterostigma greyish ochreous; membranule white in proximal third, black in distal two-thirds.

♀. Abdomen green to bluish olivaceous, all the markings (dorsal band and carinae) dull ferruginous instead of black. Second and third femora ferruginous out to a narrow black ring at the distal joint. Appendages simple, broadly lanceolate. Wings rather deep yellow between triangles and distal end of pterostigma.

♂, *Abd.* 51+5, *hdw.* 48, *pt.* 4.5 mm. ♀, 50+4, 50, 5.

The differences between this form and the European *A. imperator* have been discussed in the Schultze paper (*q.v.*); the additional materials here recorded prove once more these differences to be extremely slight. One of the males from Lorenzo Marques is stuffed, and shows the ground-colour of abdomen to be of just the same light and pure sky blue that we know in the European form. Indeed, if there was not the old name with a historical right, the writer would scarcely find the African form worthy of sub-specific distinction.

*ANAX TRISTIS* (Hagen, 1867).

S. Afr. Mus.: 1 ♂, Bulawayo, Rhodesia; Grootfontein, S.W. Protectorate (i. 1919, Lightfoot). Mus. Bruxelles: 1 ♀, Kinchassa (26. x. 1899, Waelbroeck). Mus. Tervueren: 1 ♀, Kiambi (19. ii. 1911, B. Valdonis); 1 ♂, Kunga (iii. 1913, Verschuere). Mus. Hamburg: 1 ♂, Quitta, W. Africa (J. Cordts).

♂. Labium and labrum dull ferruginous, gradually passing to blackish at free margins. Face and frons light green; at base of frons a triangular black margin, the obtuse angle of which reaches to half-way between base and anterior ridge. Thorax light green, latero-ventral sutures marked with dull ferruginous. Legs black, femora dull ferruginous at extreme base. Abdomen inflated at base, considerably contracted in segment 3, almost cylindrical, rather slender from end of 3 to 7, gradually widened to the end, to be broadest at segment 9. Segments 3-6 very long, 10 strongly convex dorsally, almost globose. Segments 1-2 light green, terminal joints lined with black, a broad bilobate black spot on dorsum of 2; 3 green to transverse carina, black posteriorly, this colour projecting almost to anterior margin in a narrow mid-dorsal line; 4-7 black, each side with a rounded light green spot at both ends, the anterior spots slightly larger on 4-5, the posterior ones on 6-7; 8-9 black with only the posterior green spots; 10 wholly black. Appendages dark brown; superiors nearly straight at lateral margin, the median margin triangularly projecting with angle slightly beyond the middle; apex truncate, medially rounded, laterally produced in a short point which is the end of the dorsal carina; distal half of median margin densely covered with long brown pubescence. Inferior appendage nearly two-fifths longer than the superior, broadly triangular, truncate and slightly emarginate. Wings hyaline; at base of the posterior a dark golden-brown spot along the membranule; slightly beyond the triangle, between  $M_4$  and anal margin, a diffuse light-brown cloud. Costal vein with a yellowish line; pterostigma dark brown on upper, ochreous on under side of wing. Membranule white in proximal third, black in distal two-thirds.

♀. Exactly similar to male in colour. Abdominal segments 3-6 much less elongate. Appendages comparatively short, foliaceous, elliptic in outline.

♂. *Abd.*  $84 + 6.5$ , *hdw.* 61, *pt.*  $< 6$  mm. ♀,  $70 + 4$ , 63,  $< 6$ .

This wonderful insect is one of the largest dragonflies, the female of otherwise regular proportions, the male conspicuous by the greatly elongate abdomen. No doubt it is a powerful flier, and it would be of interest to learn something regarding its habits and behaviour.



## ANAX GEORGIUS (Sélys, 1872).

This species is represented by the single male type in the Brussels Museum (formerly Sélysian Collection), a very old specimen, bearing besides other labels of later date an old label in de Sélys' hand—"Vanderh. Timor ? ou Natal ?." There are under the same collector's (Vanderhoffen) name other South African, but also Malaysian and Japanese insects in the collection. The home of this unique specimen remains thus uncertain; if I may venture a supposition, I would rather locate it in Africa than in Malaysia, since it is something of a reduced edition of *A. tristis*, though certainly a very distinct species. De Selys and R. Martin give somewhat summary descriptions. Martin also a coloured figure of the entire insect and a very good figure of its appendages. The following is a more detailed description of the type.

♂ (adult, rather badly discoloured, colours of living insect possibly black and green as in *tristis*). Labium and labrum dull orange. Face and frons anteriorly light green. Dorsal surface of frons greenish, blackish brown at base, this colour triangularly projecting, narrowly fused to a black line at the anterior ridge; this black line bordered by a light bluish-grey band. Thorax badly discoloured, probably light green in life; latero-ventral sutures very slightly lined with brown. Light blue small spot at wing bases. Legs black; base of first femora ferruginous internally.

Abdomen moderately inflated at base, much constricted in third segment, very gradually dilated from end of third segment, broadest at 8-9. Rather badly discoloured, markings not easily distinguished. Segment 1 greenish laterally, reddish brown on dorsum, anterior half depressed, posterior half gradually rising but not above the height of segment 2, the elevated part densely covered with short ferruginous hair. Segment 2 greenish with three laterally incomplete, transverse blackish bands: behind a first transverse carina which projects angularly hindward in mid-dorsal line, on a second transverse carina with a mid-dorsal dilatation, at posterior margin. Segment 3 black, anterior half of sides whitish, this colour widened anteriorly and narrowly ascending to mid-dorsal line at anterior end; very small, round, lateral dull ferruginous spots near posterior end. Segments 4-8 black, on each side two small, rounded dull ferruginous spots, near anterior and near posterior end; a third spot on segments 7-8 in middle of length between a supplementary and latero-ventral carina. 9-10 dark reddish brown (discoloured). Supplementary lateral carinae distinct only on segments 7-9. Appendages dull ferruginous: lateral margin of the superior ones almost straight, bending rather abruptly near the end to the obtusely rounded apex; median margin

not produced in dorsal view, bent downward in a triangular projection near the end in lateral view; dorsal carinae raised towards the end, rather densely pubescent in distal half. Inferior appendage about two-thirds the length of the superior (much longer than in *tristis*), slightly narrowed distally and rather deeply excised at apex.

Wings comparatively narrow; two rows of cells between  $Cu_1$  and  $Cu_2$  in hind wing. Very slightly tinged with greyish yellow; in hind wing a deeper yellowish, diffuse cloud between  $M_4$  and anal margin. Membranule brownish black, whitish at extreme base. Costal vein lined with ochreous. Pterostigma very dark brown, almost black.

*Abd.* 65 + 5.5, *hdw.* 53, *pt.* 4 mm. Length of segments 3, 13; 4, 10; 5, 10; 6, 9; 7, 5 mm. Breadth: end of 3, 2.3; of 5, 2.8; middle of 8, 4 mm.

#### HEMIANAX (Selys, 1883).

The single species of this genus is not widely different from *Anax*. The original definition was based on the absence of supplementary lateral carinae in the abdomen, and a triangular instead of truncate outline of the inferior appendage in the male. Under that definition a second species, the Australian *A. papuensis*, would belong to *Hemianax*. But the supplementary carinae are rather different between species, being sometimes reduced to a few terminal segments, sometimes only faintly indicated (*A. immaculifrons*). The shape of the inferior appendage is obviously not a character of generic value. The genus could be retained by applying the neural detail given in the table page (after Karsch!) as distinctive, although even this character is not of great weight. The field between  $Cu_1$  and  $Cu_2$  in hind wing is variable to some extent, even individually, and specimens approaching the *Hemianax* condition may occur in various species of *Anax*. The venation of the single *Hemianax*, as reproduced in Plate V, fig. 1, shows a wonderful example of highly elaborate specialisation, not by reduction of elements (as in many other Odonata), but by differentiation of the single elements: strengthening or weakening of veins, relative disposition of the various morphologically important forks and ramifications, fusion of cross-veins to form supplementary sectors in the various principal fields, etc. In all those points the *Hemianax* wing surpasses still the already highly specialised *Anax* neurulation; and it may well be asserted that *Hemianax* has the most beautifully organised wing of all living Odonata. I suppose that a mechanical expert (which I am not) would find great delight in a study of this marvellous work of Nature.

HEMIANAX EPHIPPIGER (Burmeister, 1839).

S. Afr. Mus. : 1 ♀, Barberton, Transvaal (i. 1912, H. Edwards); 1 ♀, Salisbury, Mashonaland (x. 1910); at sea on SS. "Eurypides," 2° 4' S., 10° 12' W. Mus. Hamburg : 1 ♂, Delagoa Bay (1893, W. Joost). Coll. E. B. Williamson : 3 ♂, 1 ♀, Mashonaland (xi. 1900, Marshall).

♂. Face and frons light yellow; at base of frons a broadly triangular black mark and a rather broad black line on anterior ridge, the two marks not fused. Thorax light greyish ochreous, passing gradually to light greenish-yellow shades at the sides. Latero-ventral sutures broadly lined with black; stigma and a small point above it black. Legs moderately long, not robust; black, extreme base of third femora ferruginous, first femora light yellowish internally. Abdomen moderately inflated at base, slightly constricted in third segment, rather slender and very gradually widened from end of 3 to 10. Segment 1 light yellowish laterally, greyish dorsally; 2 light yellowish laterally, brilliant sky blue dorsally (often discoloured in dried specimens); 3-7 ochreous to light ferruginous, with a narrow, sinuate, mid-dorsal blackish band; 8-10 blackish brown with large posterior lateral ochreous spots. Appendages ferruginous; superior in dorsal view gradually convergent in last third, to end in a rather sharp point; on lateral view the broad dorsal fold rises to a pointed tubercle at beginning of distal third. Inferior appendage not quite one-half the length of the superior, broadly triangular, its lateral ridges each armed with a row of dorsally directed sharp black spines.

Wings very slightly tinged with yellowish grey, with a broad cloud of deeper yellow in hind wing between  $M_4$  and anal margin. Venation in great part light ochreous. Pterostigma ferruginous. Membranule white at base, passing gradually into light grey at the wings' edge.

♀. Very similar to male in colour, but apparently no blue on dorsum of second abdominal segment. Appendages foliate, rather broadly elliptical in outline, with pointed apex.

♂, *Abd.* 40 + 5, *hdw.* 43, *pt.* 5 mm. ♀, 38 + 4.5, 47, 5.

The species has a very wide range over the whole African continent, Asia to Turkestan and India and the islands of the Indian Ocean; it is found, at least casually, in Mediterranean Europe, and isolated specimens have even been taken in the British Isles, in Belgium and in Switzerland. Various records testify to it being a wanderer and sometimes assembling in immense numbers. It is repeatedly found in desert regions (as in Egypt and in oases of the Sahara). Its colour system is strikingly desertic. The larva is as yet unknown.

## II D. FAMILY LIBELLULIDAE.

## II DA. SUBFAMILY CORDULINAE.

As shown in the table (p. 338), it is not possible to give a short definition of the two subfamilies of *Libellulidae* without giving at least one unisexual character (the angulate hind wings of male in *Cordulinae*), and even this character is not universal, as it is wanting in the rather important genus *Hemicordulia* (like *Anax* in the *Aeschninae*, and also like *Anax* a highly specialised type). The only bisexual character of *Cordulinae*, the temporal projection of the eyes, is rather inconspicuous and also suffers exceptions, since a few *Libellulinae* (of the group *Urothemis*) show similar projections. Other characters of *Cordulinae* are also unisexual: semitransparent narrow lamellae at interior margin of tibiae in males (strictly proper to *Cordulinae* if confronted with *Libellulinae* alone, but present also in *Chlorogomphinae*); strongly developed and differentiated terminal appendages in males (a character of only relative value, more for the *Cordulia*- than for the *Macromia*-line of the subfamily); unbranched hamuli in genitalia of male (regular for all the *Cordulinae*, but existing also in not a few *Libellulinae*); a pair of anterior hamuli visibly developed, against the anterior lamina of same organs, seems more characteristic for the *Macromia*-line, though existing in rudiments also in the *Cordulia*-line. The bisexual character of predominant metallic colours is a very conspicuous one, though not fully distinctive: there are some *Cordulinae* with no metallic colours, and not a few *Libellulinae* with highly metallic ground-colour or pattern. With all these exceptions and restrictions the two subfamilies are well justified, and an expert will scarcely ever have a moment's doubt about the correct placing of any given specimen.

*Cordulinae* are much less homogeneous than *Libellulinae*; evidently some very ancient developmental lines have been retained and exist in a few, now isolated, representatives. Various attempts to a rational classification have been recently made; the best of them (according to the writer's opinion) is by Mr. E. B. Williamson. Without regard to minor and partly intermediate groups two main branches may be distinguished: the *Macromia*-line with *Aeschnid* (more especially *Chlorogomphine*) affinities in general build and also to some extent in venational characters, and the *Cordulia*-line which approaches *Libellulinae* in both these characters.

In Africa only the *Macromia*-line is fairly represented, and only a few members of this line are met with in our present faunal limits.

*Cordulinae*, as far as known to the writer by personal observation and as far as precise records exist, have in common a peculiar manner of flight. Their motion is particularly sustained, even more so than in *Aeschninae*, and the same individual may be, with sufficient patience, observed for an almost indefinite time planing to and fro without a moment's pause, and they stand—this particular motion is more developed in them than in any other group of dragonflies—often for a long time on the same point. Their particular manner of motion makes some of them an easy prey, as the collector will know perfectly where the insect will turn up within a short time and be within reach of his net. But he must not wait to see his *Cordulina* taking rest; he might wait for half an hour or more and then see it fly suddenly away; the very regularity of the motion makes a stroke at the flying insect pretty efficacious. But this is not the rule; in most species the flight is not only sustained but also exceedingly swift, and the insect, moreover, defiant, and not ready to leave the open water or some high level over a forest road. This may be particularly the case for the *Macromia*-line of the subfamily, as proved in Mr. Williamson's interesting report. Material from the exotic regions, where dragonflies have rarely been collected by specialists, is scarce, and descriptions are often made from a few, or even from single specimens.

There is no other group of large, conspicuous and beautiful forms amongst *Odonata* where our knowledge is so poor and so fragmentary as for the *Macromia*-group of *Cordulinae*. Only the North American species are now well known, and even these only since a few years. The material at our disposal for the present paper is fragmentary. The existence of a greater number of species in the temperate part of the country does not seem probable, but a few more may be expected from these parts where tropical conditions of climate prevail.

*Corduline* nymphs of the *Macromia* groups are similar to *libelluline* nymphs (see before) in structural details, but characterised by their exceedingly long legs and a cylindrical horn-like process on the frons. They may be looked for in standing as well as in running waters.

#### MACROMIA (Rambur, 1842).

The African *Macromia*, all or part of them, may at some later date be separated from the main body of the genus; a fraction has even been placed in a subgenus (genus according to R. Martin) *Phyllomacromia* by de Selys. The characters given for *Phyllomacromia*

as distinct from *Macromia* are: (1) a single row of post-trigonal cells; (2) eighth segment of male dilated, sides foliaceous; (3) tenth segment not raised; (4) superior appendages of male not dented externally. Unfortunately this definition will not hold good even with the very limited material seen by the writer: (1) is an unusually variable character just in the group under discussion; differences are mostly sexual, but also individual; (2) seems a good character, though it will probably not unite all species of real affinity; (3) is evidently of no generic value; there are species otherwise very closely similar with a plain tenth segment in males (*M. africana*) and with dorsally pointed tenth segment (*M. picta*); (4) seems a good character, although unisexual, but it seems to be common to all African *Macromia*, not to the Sélysian *Phyllomacromia* alone. Most probably a definition can be found to characterise the whole of the African *Macromiæ*—under the name *Phyllomacromia*—but the definition cannot be attempted here owing to a lack of the greater number of described species. Also I prefer not to adopt the name *Phyllomacromia* here, with a definition that would be in flagrant contradiction to the one given it by its author; it seems better to record our few species under the general name of *Macromia*.

1. Pterostigma black. Abdominal segment 3-6 at most with a bilobate transverse yellow band in anterior third. Superior appendages black. Pointed elevation of tenth segment in male almost as high as the rest of the segment 2.

Pterostigma ochreous or light ferruginous. Abdominal segments 3-6 basal half to basal third yellow, a mid-dorsal black spot in the yellow ring producing a pupillate pattern. Superior appendages ochreous. Pointed elevation of tenth segment in male about one-half the height of the rest of the segment . . . . . *M. picta*.

2. Face and frons ferruginous, with small greenish spots at the sides and in the median furrow of frons. Abdominal segments 5-6 wholly black in male, with very small dorsal yellow spots in female. Inferior appendage of male of about the same length as the superior; superior parallel. Hamuli black, with an ante-apical transverse ridge light yellow. Posterior end of dorsal ridge of ninth segment projecting as a sharp spine.

*M. thetis*.

Face and frons anteriorly ferruginous with a crescentic spot on post-clypeus yellowish; a broad light yellow band on dorsal surface of frons, descending along the eyes to lateral ends of post-clypeus. Abdominal segments 5-6 with dorsal yellow spots in male (female unknown).

Inferior appendage of male sensibly shorter than superior; superior diverging posteriorly. Hamuli wholly black. Dorsal ridge of segment 9 not projecting in a posterior spine . . . . . *M. clymene*.

*MACROMIA PICTA* (Sélys, 1871).

S. Afr. Mus.: 1 ♂, Barkley West (xii. 1893, L. Péringuey); 1 ♂, Durban, Natal (iv. 1890, J. H. Bowker); 1 ♂, Barberton, Transvaal; 1 ♀, Kranspoort (21. xii. 1906). Coll. K. J. Morton: 1 ♂, Eshowe, Zululand (4. iii. 1908, Miss Fountaine); 1 ♀, King Williamstown, Cape Colony (3. i. 1908, ead.). Coll. E. B. Williamson: 2 ♂, 1 ♀, Hilton Road, Natal, 3800 ft. (23. xii. 1909, G. F. Leigh); 1 ♀, Princetown, Natal (20. iii. 1909, *id.*). Mus. Hamburg: 1 ♂, Bothaville, Orange Free State (8. xi. 1898, Dr. H. Brauns).

♂. Median lobe of labium light ochreous with black longitudinal line; lateral lobes dull ferruginous, gradually turning to ochreous medially. Labrum ferruginous with two basal yellow spots (confluent to form a transverse band in the specimen from Bothaville); anteclypeus olivaceous; post-clypeus olivaceous in anterior half, yellowish in posterior half and at the sides (almost wholly yellowish in the specimen from Bothaville). Frons ferruginous anteriorly; dorsal surface black at base, with an anterior bright yellow band that descends along the eyes (the yellow band broadest in the specimen from Bothaville); vertex black, with small double yellow spot at tip to yellow with black base. Occipital triangle yellow. Thorax dull ferruginous with metallic blue reflections and light yellow bands: rather broad ante-humeral stripes, slightly convergent dorsally, not fully reaching to ante-alar sinus; broad transverse band filling up the ante-alar sinuses; first lateral (metepisternal) band crossing the stigma, rather conspicuously widened dorsally; second lateral (metepimeral) band filling somewhat less than posterior half of metepimeron, also widened dorsally.

Legs very long and robust, dark brown to blackish; third femora ferruginous, at least internally; first femora light yellow internally in basal two-thirds. Tibial laminae along the full length of third pair, distal half of first pair, absent on second pair.

Abdominal segments 1-2 moderately inflated, 3 moderately constricted, 4-6 cylindrical, 7-9 dilated in lateral and more in dorsoventral dimension, the sides of 8 projecting in a triangular, foliaceous extension; 10 small, dorsum elevated in a conical tubercle of about one-half the segment's height, very sharply pointed. Segments 1-2 dark brown, 3-6 black, 7-10 dark ferruginous with light yellow markings; on segment 2 sinuate transverse band, over the auricles, posterior ventral incomplete narrow band from the genital lobe to one-half the segment's height; segment 3 complete narrow basal ring and anteriorly bilobed median spot; 4-6 basal

ring and sub-median dorsal bilobate spot confluent at the sides, the black colour thus forming a rhomboid mid-dorsal spot within yellow ground; 7 basal yellow ring to nearly one-half the segment's length; 8 narrow transverse lines near anterior end not quite reaching to lateral nor to mid-dorsal line and a very narrow line at posterior margin to two-thirds of the segment's height; similar terminal narrow line on segment 9; 10 ferruginous, gradually turning to yellowish in posterior half.

Superior appendages light ochreous, rather widely distant, parallel; inferior appendage very little shorter, broadly cut at end, ochreous, bordered with fuscous. Genital organs of segment 2: anterior lamina small, not elevated; behind this, two obtuse vertically projecting lobes (anterior hamuli); these lobes and the lamina clothed with long ferruginous hair. Hamuli strong, roughly rhomboid in outline, with their fine point curved outwards, an obtuse ridge running from the dorsal posterior to the ventral anterior angle; black, the fine point yellowish. Lobe projecting very nearly as much as the hamule, nearly rectangular in outline, with rounded edge.

Wings hyaline, slightly tinged with greyish yellow in highly mature specimens. Pterostigma light ferruginous. Costal vein rather broadly lined with yellow. Membranule whitish to greyish. A single row of cells in beginning of discoidal field in both front and hind wings; between  $Cu_1$  and  $Cu_2$  in hind-wing but once, at base, two cells, otherwise a single row. Reticulation (Plate X, fig. 1) less variable than in female.

♀. Slightly more robust than male, but very similar in shape and colour; the terminal abdominal segments chiefly dilated in lateral, much less in dorsoventral dimensions. Yellow markings of abdomen slightly more extended than in male, the pupillate pattern approximately developed also on segment 3. Appendages short. Genital segments much as figured for the following species, but the very small valvular scale more deeply excised.

Wings light golden yellow from slightly beyond the nodus to near the tip, and with the base golden yellow to first antenodal and first cubito-anal cross-veins (yellow colour least of all our specimens in the one figured—Plate X, fig. 1). Neuration much more dense and much more variable than in male. The specimen figured is nearest to the male of all those examined. Others show evident transition to conditions of following species, mostly so the specimen from Hilton Road: fully two rows of discoidal cells in both front wings and right hind wing, one cell but twice in left hind wing; fully two rows between  $Cu_1$  and  $Cu_2$  in right hind wing, two rows twice interrupted by single



cells in left hind wing. The other specimens are intermediate between this condition and the figured pair of wings.

♂, *Abd.* 40, *hdw.* 34, *pt.* > 2 mm. ♀, 40, 36, > 2.

The nomenclatorial questions regarding this species have been discussed in the paper on Schultze's voyage. I have no reason not to follow now the conclusion there arrived at.

#### MACROMIA THETIS, n. sp.

Brit. Mus.: 1 ♂, Chirinda Forest, Gazaland, 3600 ft. (9.x.1905, G. A. K. Marshall); 1 ♀, Mazoe, 4700 ft., Mashonaland (28.xii.1905, *id.*). S. Afr. Mus.: 1 ♀, Barberton, Transvaal.

♂. Labium light yellow, an oblique fuscous stripe on lateral lobe. Labrum ferruginous. Ante- and postclypeus ferruginous with an olivaceous shade. Frons ferruginous in front and dorsally, olivaceous laterally turning to yellowish towards the eye; base rather broadly, but diffusely darkened and metallic blue, a small and diffuse yellowish spot in the very deep furrow. Vertex blackish, with metallic blue sheen, diffusely turning to ochreous above and in front. Occipital triangle black; occiput very dark ferruginous. Thorax dark ferruginous, marked with greenish yellow and black, with metallic blue sheen. Yellowish: narrow line on median suture; ante-alar sinus; broad antehumeral band, beginning on mesinfraepisternum, just touching ventral end of humeral suture, distant from dorsal end of same suture by about one-half of its own breadth, not quite reaching to ante-alar sinus; first lateral band at the stigma, broader by about one-half; second lateral band somewhat less than posterior half of metepimeron. Blue-black; diffuse stripes bordering the yellow bands, the antehumeral one behind, the first lateral one on both sides and the second lateral one in front. Legs robust, very long, black, base of femora diffusely dark ferruginous. Tibial laminae as in *picta*.

Abdominal segments 1-2 moderately inflated, 3-6 slender, cylindrical; 7-10 scarcely dilated in lateral, much in dorsoventral dimension; lateral margin of 8 broadly rounded, not distinctly foliaceous; ninth and tenth segment, see p. 376 and Text-fig. 65. Segment 1 dull ferruginous, an indistinct yellowish spot at ventral margin; 2-6 black, 7-10 dark ferruginous, with yellow markings: segment 2, complete transverse band, touching anterior end at ventral margin separated from end in mid-dorsal line by a ferruginous space; narrow line bordering genital pocket and lobe; 3 narrow, dorsally interrupted basal ring and submedian bilobed dorsal spot; 4 very small submedian dorsal double spot; 5-6 wholly black; 7 complete basal ring

to about one-third length of the segment's length; 8 very small spots at ventral margin. Appendages blackish; superior parallel in dorsal view, narrow, gradually narrowed to end, obtuse; in side view very slightly curved downward; inferior appendage of about equal length, squarely cut at end. Genital organs on segment 2 similar to *M. picta*; a transverse obtuse ridge on anterior lamina densely fringed with black hair; hamuli broadly elliptical in outline, curved points turned hindward and laterally, a transverse ridge conspicuously yellow, the hamule otherwise blackish. Lobe larger than hamule, almost rectangular, inclined to an angle of about  $45^\circ$ .

Wings hyaline; costal vein black with a very narrow yellow line. Pterostigma black. Minute brown spot at base of hind wings from *C* to *A*. Membranule white in proximal, diffusely light grey in distal half.

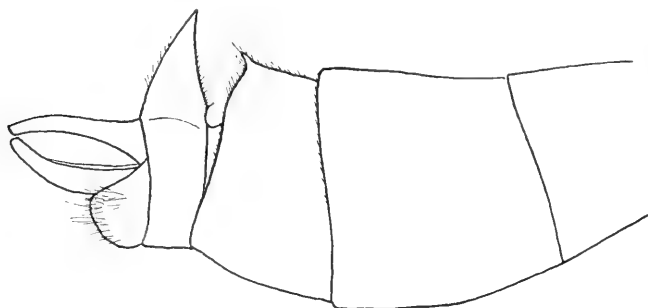


FIG. 65.—*Macromia thetis*, ♂. Chirinda Forest. Terminal segments, right side view.

*Anq.*  $\frac{16\frac{1}{2}}{11} \cdot \frac{16}{11}$ , *Cuq.*  $\frac{5}{4} \cdot \frac{5}{4}$ , *ht.*  $\frac{5}{2} \cdot \frac{5}{2}$ ; in front wing two rows of discoidal cells to level of bridge; in right hind wing 3, in left one 2 cells running from *M*<sub>4</sub> to *Cuq*.

♀. Similar to male. Sides of frons and postclypeus at the eye more distinctly yellowish. Thorax as in male. Abdomen more robust, very little dilated on segments 7–9; yellow markings generally slightly more extended, except in second segment, where the transverse band appears dissolved into four spots; on segment 3 the narrow basal ring is very nearly complete and the submedian dorsal spots extend posteriorly beyond the transverse carina; 4 submedian spots almost as on 3 and also minute spots behind the carina; 5 6 very minute submedian spots. Appendages short, sharply pointed, black; supra-anal tubercle with a sharp dorsal keel. Genital segments as in Text-fig. 66, a conspicuous light yellow spot on the otherwise obscure ninth ventral plate.

Wings hyaline, very light golden yellow from nodus outward; very small golden yellow basal spot. Costal vein wholly black.

$Anq.$   $\frac{14(\frac{1}{2}) \cdot 15(\frac{1}{2})}{10 \cdot 11}$ ,  $Cuq.$   $\frac{7 \cdot 6}{4 \cdot 5}$ ; in front wings two rows of discoidal cells to level of bridge, also in hind wing; two full rows of cells between  $Cu_1$  and  $Cu_2$  in hind wing.

♂, *Abd.* 48, *hdw.* 39, *pt.* < 3 mm. ♀, 50, 43, 3.

The above description is made from the typical pair in the British Museum; the ♀ from Barberton is very probably of the same species. It is immature, smaller (*Abd.* 40, *hdw.* 40, *pt.* 3 mm.), and has the wings richly coloured with golden yellow, darkening to brownish at base, as

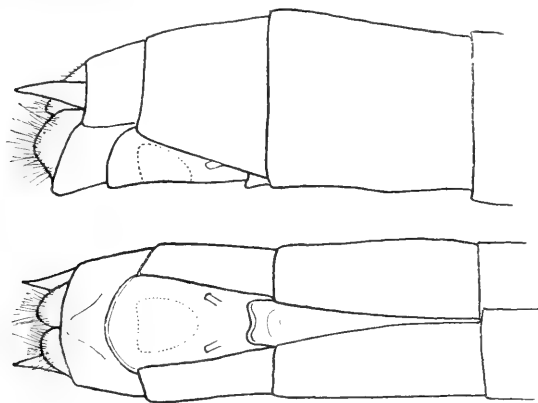


FIG. 66.—*Macromia thetis*, ♀. Mazoe. Terminal segments, right side and ventral view.

shown in Plate X, fig. 2. Of existing descriptions *Phyllomacromia aequatorialis*, Mart., comes nearest to this species, but it must be a considerably smaller species, its yellow markings still more reduced, the frons is metallic black above, the pterostigma brown, a single row of discoidal cells in front wing of male; *aequatorialis* is said to come from "Afrique occidentale."

#### MACROMIA CLYMENE, n. sp.

Mus. Tervueren: 2 ♂, Kapiri, Katanga (x. 1912, Legros).

Very similar to preceding species. Neuration of the same type, having two rows of discoidal cells in front wing, a short stretch of but one row in hind wing. A single row of cells between  $Cu_1$  and  $Cu_2$  in hind wing throughout, or two cells but once at the beginning of this field.

The differences are as indicated in the table (p. 376) to which may be added: antehumeral yellow band broader, fused to yellow of antalar sinus in one specimen, very nearly so in the other one; basal yellow ring of segment 7 much broader, between one-half and two-thirds of the segment's length; dorsal process of tenth segment slightly smaller and different in shape, as shown in Text-fig. 67.

*Abd.* 51, *hdw.* 41, *pt.* 2-5 mm.

These differences, slight as they are, may safely be claimed as specific, since differences in colour appear together with other structural ones. Especially important is the presence of a frontal yellow band in *clymene*. The pair of forms here described recalls another pair

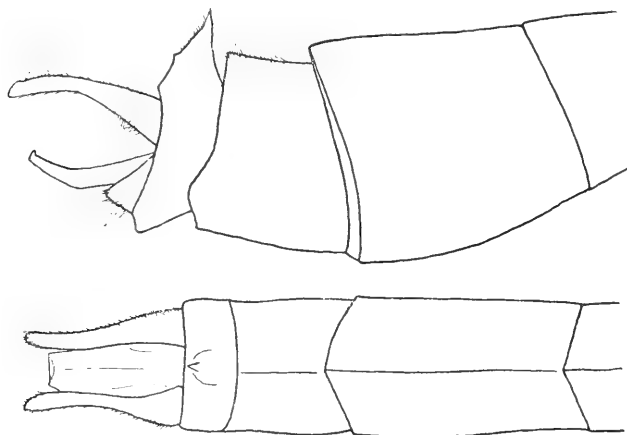


FIG. 67.—*Macromia clymene*, ♂. Kapiri. Terminal segments, right side and dorsal views.

closely similar to each other—*terpsichore*, Forst., and *melpomene*, Ris, from New Guinea, which we have good reasons to consider as distinct species. Mr. Williamson's studies on North American *Macromia* give also evidence of specific differences being sometimes very slight in this genus.

## II DB. SUBFAMILY LIBELLULINAE.

In a collection of dragonflies from almost every region of the globe individuals belonging to this systematic unit will probably be in majority over those of all the other units taken together, supposing that the material is not accumulated by a specialist more interested in it than in groups. *Libellulinae* are numerous in species, many of these

common where they occur, and little given to hiding; although swift flyers, they often settle on vegetation or on the ground, and are therefore an easier prey than *Aeschninae* or *Cordulinae*; many of them are not very particular about the kind of waters they inhabit, the great majority preferring standing water, from large areas down to pools and swamps. Most species are wide ranging, some occurring over immense areas, either without any appreciable differences or with division into subspecific forms in various degrees of divergence. Three species of the present fauna occur as well in South Africa as in Mediterranean Europe (*Orthetrum chrysostigma*, *Crocothemis erythraea*, *Sympetrum Fonscolombei*); others are more of the inter-tropical type and occur only at the frontiers of both faunae—European and South African, but not commonly (*Orthetrum trinacria*, *Trithemis annulata*); a good number are common to the entire African continent, or at least

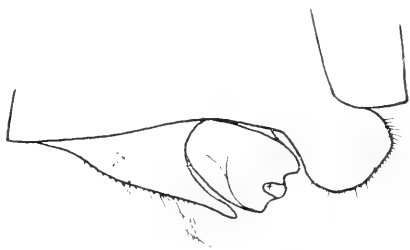


FIG. 68.—*Orthetrum trinacria*, ♂. East Africa. Genitalia, second segment, left side view.

to the region south of the desert belt; others are found even beyond this limit in parts of tropical and sub-tropical Asia, etc.

The subfamily is morphologically a very homogeneous unit; there are many constant and important differences in venation between genera and groups of genera, but the differences are mostly slight or inconspicuous, and were almost overlooked by the earlier systematists, who found great difficulties in subdividing the great and homogeneous group. From various reasons—morphological, biological and geographical—we may safely conclude that *Libellulinae* are a caenogenetic group, flourishing and in full development in the present age of the globe. In this respect they have in the suborder *Zygoptera* a parallel in the subfamily *Agrioninae*, more especially in the “*Légion Agrion*.”

Libelluline nymphs are of remarkably uniform type. Body short, dorsal surface moderately convex. Labium short; lateral lobes broad and convex, their mesial margins touching in a long line, the whole forming when stretched out a spoon-like structure, with long and stiff

spines or bristles on the inner surface of mentum and lateral lobes forming a kind of basket. When closed the labium covers the inferior and anterior side of the head like a mask. Plate XII, fig. 5 and fig. 6 represent two principal types of Libelluline nymphs.

(a) The *Orthetrum*-type: Head with nearly parallel sides, small eyes, antennae inserted well in front of the eyes; legs robust and hairy; integument opaque; mostly living half-buried in mud at the bottom of water.

(b) The *Sympetrum*-type: Head with sides very convergent posteriorly, eyes large, antennae inserted scarcely in front of anterior margin of eyes; legs slender, less hairy; living often free between plants—in this case semitransparent, greenish or yellowish, often with a rich pattern of dark tints.

In the following descriptions structural details of male and female genital organs are generally omitted, though their diagnostic value is evident in many cases of doubtful specimens. For the limited fauna here concerned, amply sufficient distinctive characters were available in details of colour, pattern and venation. The genital structures are fully described, and a great many of them also figured in the writer's monograph of the *Libellulinae*; it was therefore not desirable to repeat descriptions and figures here without diagnostic necessities. The only exception was made for the genus *Orthetrum*, where the male genital structures are indispensable for identification of many specimens with the original pattern covered by the blue pruinosity of adults, and where these characters are the only sure guide in a very intricate group of closely allied species.

1. Arculus distal to second *Anq.* (Plate X, fig. 4) . . . . . 2.  
     Arculus proximal to second *Anq.* (Plate XI, figs.) . . . . . 4.
2. Last *Anq* in front wing complete . . . . . 3.  
     Last *Anq* in front wing incomplete, existing only in costal field, ending at the subcosta. 2 *Cuq* in hind wing. Proximal side of *t* in hind wing a little distal to arculus. *t* free in both wings. Discoidal field in front wing beginning with two rows of cells;  $M_4$  and  $Cu_1$  divergent from a level proximal to nodus, the field considerably widened to wing's edge. No distinct *Mspl.* One row of cells *Rs-Rspl.* 10½ *Anq.* Posterior lobe of prothorax large, erect, ciliate. Abdomen short, slender and slightly fusiform in ♂, robust and cylindrical in ♀. Third femora with 4-5 (♀) or 8 (♂) long and robust spines. ♀ with margins of eighth segment folded; vulvar scale small . . . . . *Porpax.*
3. Discoidal field in front wing beginning with one row of cells.  $M_4$  and  $Cu_1$  divergent from a level proximal to nodus, discoidal field much widened to wing's edge. *t* in front wing almost equilateral; proximal side of *t* in hind wing a little distal from arculus. *t* free in both wings. 2 *Cuq*

in hind wing. One row of cells *Rs-Rspl*, *Rspl* not very distinct. 11 *Ang*. Hind lobe of prothorax moderate, erect, emarginate in middle, ciliate. Abdomen thin, cylindrical in ♂ (♀ unknown). Third femora in ♂ with very numerous (about 40) denticles, triangular in proximal, quadrangular in distal half . . . . . *Notiothemis*. Discoidal field in front wing beginning with 3 rows of cells; *M*<sub>4</sub> and *Cu*<sub>q</sub> divergent from a level proximal to nodus and very much widened to wing's edge; *Mspl* very distinct. *t* in front wing with costal side short, proximal and distal sides very long. Proximal side of *t* in hind wing at arculus. *t* crossed in front wing, free in hind wing. 1 *Cu*<sub>q</sub> in hind wing. One or two rows of cells *Rs-Rspl*. *M*<sub>2</sub> in deep double curve. More than 10 *Ang*. (Plate X, fig. 4.) Hind lobe of prothorax large, erect, ciliate. Frons prominent, with distinct anterior ridge, flattened anteriorly, where two roughly triangular fields are circumscribed by a fine elevated line. Abdomen depressed in male, otherwise variable in form; constricted at third segment and fusiform, or broader and very gradually narrowed to end; in female more cylindrical; margins of eighth segment foliate; vulvar scale small or absent. Legs short and robust, spines small in femora, longer and more robust in tibiae . . . . . *Orthetrum*.

4. Last *Ang* in front wing incomplete. (Plate X, figs. 5, etc.) . . . . . 5.  
 Last *Ang* in front wing complete. (Plate XI, fig. 8) . . . . . 20.
5. Costal vein in front wing in continuous curve from base to nodus. (Plate X, figs. 11, etc.) . . . . . 6.  
 Costal vein in front wing with an infraction about half way between base and nodus. Wings variegated with black or black and yellow. Sectors of arculus with separate origin or a very short common stalk in front wing, a slightly longer common stalk in hind wing.  
 1-2 *Cu*<sub>q</sub> in hind wing. *Bqs* mostly present (only genus of present fauna with this character). *Cu*<sub>1</sub> in front wing short and strongly convex; 3 (2) to 4 rows of cells in discoidal field, discoidal field not much widened to wing's edge, a parallel curve of *M*<sub>4</sub> compensating the convexity of *Cu*. Costal side of *t* in front wing comparatively long; *t* crossed in both wings. Anal field broad in hind wing; *A*<sub>2</sub> almost straight; cells between *A*<sub>3</sub> and wing's edge distinctly disposed in transverse rows. Pterostigma large, two-coloured. (Plate X, figs. 5-10.)  
 Hind lobe of prothorax moderate. Abdomen short and depressed in both sexes; margins of eighth segment folded in female, no distinct vulvar scale . . . . . *Palpopleura*.
6. *t* in front wing considerably, by 3 or more cells' distance, distal to level of *t* in hind wing. Anal field in hind wings very broad. (Plate XI, figs. 6, 7) . . . . . 18.  
*t* in front wing on same level with *t* in hind wing, or but slightly, by not more than 2 cells' distance, distal to same. (Plate X, fig. 11, and Plate XI, figs. 1-5) . . . . . 7.
7. *M*<sub>4</sub> and *Cu*<sub>1</sub> in front wing divergent from a level proximal to nodus, discoidal field considerably widened to wing's edge. (Plate X, fig. 11, and Plate XI, figs. 1-3) . . . . . 8.

- $M_4$  and  $Cu_1$  in front wing approximately parallel at least to a level of nodus; discoidal field between parallel veins to wing's edge, or contracted, or widened only for a short distance in a level far distal to nodus. (Plate XI, figs. 4, 5) . . . . . 13.
8. In discoidal field of front wing two rows of cells at  $t$ ;  $t$  in front wing free. (Plate XI, fig. 2) . . . . . 9.  
In discoidal field of front wing, 3-4 rows of cells at  $t$ ;  $t$  in front wing crossed (Plate X, fig. 11, and Plate XI, figs. 1, 3) . . . . . 11.
9. In hind wing proximal side of  $t$  at arculus. Origin of  $Cu_1$  in hind wing separate from anal angle of  $t$ .  $Mspl$  distinct, at least in front wing.  $ti$  in front wing free or of 2 (rarely 3) cells  $6\frac{1}{2}$ - $7\frac{1}{2}$  *Ang.* (Plate XI, fig. 2) . . . . . 10.  
In hind wing proximal side of  $t$  distal to arculus.  
Origin of  $Cu_1$  in hind wing at anal angle of  $t$ . No distinct  $Mspl$ .  $ti$  in front wing of 3 cells  $8\frac{1}{2}$ - $10\frac{1}{2}$  *Ang.* One row of cells  $Rs$ - $Rspl$ . Hind wings comparatively narrow; between  $A_3$  and wing's edge 2 rows of cells in middle of field. Pterostigma light coloured in central, dark in peripheral parts. Hind lobe of prothorax moderate. Abdomen short, depressed in male, cylindrical in female. In male a large bifid process on first ventral plate; in female margins of eighth segment folded; no distinct vulvar scale . . . . . *Chalcostephia*.
10. Basal segments of abdomen (1-4 or 5) much widened, vesiculate, their joints soldered; terminal segments thin, cylindrical. Hind lobe of prothorax large. Female with margins of segment 8 folded, small but distinct vulvar scale. In hind wing cells between  $A_3$  and wing's edge very large, disposed in transverse rows. (Plate XI, fig. 2) . *Acisoma*.  
Basal segments of abdomen of ordinary form, terminal segments slightly fusiform in male, cylindrical in female. Hind lobe of prothorax moderate. Female with genital segments as in preceding genus. In hind wing cells between  $A_3$  and wing's edge of ordinary size, not distinctly disposed in transverse rows . . . . . *Diplacodes*.
11. Pterostigma unicolorous. No black stripe in subcostal field. (Plate XI, fig. 3.) Hind lobe of prothorax small. Abdomen depressed, comparatively broad . . . . . 12.  
Pterostigma two-coloured, white in proximal, black in distal half. Male with black stripe in subcostal space of front wings. (Plate X, fig. 11.) Female with tips of wings blackish brown. (Plate XI, fig. 1.) Hind lobe of prothorax moderate. Abdomen narrow, slightly fusiform in male, cylindrical in female. Margins of eighth segment in female folded, vulvar scale rather large . . . . . *Hemistigma*.
12. Double curve of  $M_2$  moderately developed. In hind wing cells between  $A_3$  and wing's edge not distinctly disposed in transverse rows.  $t$  in front wing with one cross-vein, in hind wing predominantly free. Three rows of cells in discoidal field of front wings, predominantly one row  $Rs$ - $Rspl$ , one row  $M_4$ - $Mspl$ . (Plate XI, fig. 3.) Angles of frons not projecting. Females with margins of eighth segment folded, vulvar scale erect, large. On anterior surface of frons two distinct triangular flattened spaces . . . . . *Crocothemis*.



Double curve of  $M_2$  very deep. In hind wing cells between  $A_3$  and wing's edge distinctly disposed in transverse rows.  $t$  in front wings mostly with two cross-veins, crossed in hind wings. Mostly 4 rows in discoidal field of front wings; 2-3 rows  $Rs-Rspl$  and  $M_4-Mspl$ .

Angles of frons projecting, acute. General forms as in preceding genus, also genital segments of female. No triangular flattened spaces on anterior surface of frons . . . . . *Bradinopyga*.

13. Number of  $Anq$  small, mostly under 8. (Plate XI, fig. 4) . . . . . 14.  
Number of  $Anq$  greater, more than 8, mostly over 10. Hind lobe of prothorax small. (Plate XI, fig. 5) . . . . . 16.

14. Hind lobe of prothorax large, bilobate, erect, ciliate.  $Cu_1$  in front wing but feebly convex. Abdomen comparatively short, more or less fusiform in male, cylindrical in female. Margins of eighth segment folded in female; vulvar scale variable . . . . . 15.  
Hind lobe of prothorax small. Fourth segment of abdomen with distinct transverse carina. Discoidal field in front wing approximately parallel, by  $Cu_1$  and  $M_4$  being about equally convex. In front wing costal side of  $t$  long,  $t$  free or crossed.  $Cu_1$  in hind wing variable, at anal angle of  $t$  or separate. Abdomen short and robust; depressed in male, more cylindrical in female.

In female margins of eighth segment folded, small but distinct vulvar scale; ventral plate of ninth segment broad . . . . . *Brachythemis*.

15.  $t$  in front wing crossed, costal side comparatively long. Discoidal field beginning with 3 rows of cells, distinctly narrowed to wing's edge.  $Cu_1$  in hind wing at anal angle of  $t$ ; cells between  $A_3$  and wing's edge not disposed in transverse rows. (Plate XI, fig. 4) . . . . . *Sympetrum*.  
 $t$  in front wing free, costal side short. Discoidal field mostly beginning with two large cells, then 3 rows; almost parallel to wing's edge.  $Cu_1$  in hind wing separate from anal angle of  $t$ ; cells between  $A_3$  and wing's edge distinctly disposed in transverse rows . . . . . *Philonomon*.

16. Anal loop in hind wing long, external angle 3-4 cells' distance beyond level of distal angle of  $t$ . Large forms . . . . . 17.  
Anal loop in hind wing shorter, external angle about 2 cells' distance beyond level of distal angle of  $t$ .

Medium sized and smaller forms.  $Rs$  straight;  $M_2$  convex in simple curve or with very slight indication of double curve. 2 rows  $Rs-Rspl$ . Discoidal field in front wing between almost parallel veins or slightly narrowed to wing's edge.  $Cu_1$  almost straight. (Plate XI, fig. 5.) Pterostigma small. Colour system red with various mixture of black, or black and yellow, with or without blue pruinosity. Abdomen variable.

*Trithemis*.

17. Spines of tibiae fine. Pterostigma comparatively small. Moderate or deep double curve of  $M_2$ . Colour system black and yellow, often metallic. Abdomen variable . . . . . *Pseudomacromia*.  
Spines of tibiae robust. Pterostigma large. Very deep double curve of  $M_2$ . Colour system as in preceding genus.  
Abdomen much inflated in basal segments, very slender hindward.

*Oligostrata*.

18. One cubito-anal cross-vein in hind wing.  $M_2$  almost straight. Basal abdominal segments with not more than one transverse carina . . . . . 19.
- In hind wing a second cubito-anal cross-vein, running obliquely to proximal angle of  $t$ . Very deep double curve of  $M_2$ . Very long anal loop, consisting of two rows of cells, or at most one interpolated cell at external angle, with  $A_2$  bent in gentle curve;  $A_3$  fractured near base; a supplementary sector arising at the angle divides the anal field in a proximal part of small cells, which are arranged in transverse rows, and a distal part of more ordinary, less regularly arranged cells. Pterostigma small, longer in front than in hind wing. Abdominal segments 3 and 4 with two supplementary transverse carinae (besides the normal one), 5 also with a transverse carina . . . . . *Pantala*.
19. Pterostigma small, longer in front than in hind wing.
- Costal side of  $t$  in front wing very short, proximal and distal sides very long. Anal loop long, with interpolated cells at anal angle of  $t$  and at external angle; with  $A_2$  strongly bent and distal part of  $A_3$  often partially dissolved. Anal field between  $A_3$  and wing's edge as in *Pantala*. Colour predominantly red; brown or brown and yellow basal spot in hind wings. Large forms . . . . . *Tramea*.
- Pterostigma about equal in both pairs of wings. Costal side of  $t$  in front wing comparatively long. Anal loop less elongate, with  $A_2$  almost straight and end of  $A_3$  not dissolved. Partition of anal field between  $A_3$  and wing's edge not so distinct. Colour predominantly bronzy black; wings with metallic black or black and yellow markings. (Plate XI, figs. 6, 7.) Smaller forms . . . . . *Rhythemis*.
20. Number of *Anq* small (6-7). Sectors of arculus in front wing separated or with common stalk very short.  $t$  in front wings free. Two rows of cells in discoidal field of front wings, or once 3 cells at  $t$ . One row *Rs-Rspl*. (Plate XI, fig. 8) . . . . . 21.
- Number of *Anq* greater (more than 10). Sectors of arculus with long common stalk in both wings.  $t$  in front wings crossed, 3 rows in discoidal field; 2 rows *Rs-Rspl*. General facies, colour system and genitalia much as in *Trithemis* . . . . . *Helothemis*.
21. Larger forms.  $ti$  in front wings 3-celled; about 5 rows between  $A_3$  and wing's edge in hind wing. (Plate XI, fig. 8.) Abdomen comparatively short and broad, depressed, gradually narrowed hindward in male, more cylindrical in female. No external branch in hamule of male; vulvar scale large in female . . . . . *Urothemis*.
- Small forms.  $ti$  in front wing free; 2-3 rows between  $A_3$  and wing's edge in hind wing. Abdomen similar in shape to preceding genus, also genitalia of both sexes . . . . . *Tethriamanta*.

### NOTIOTHEMIS, nov. gen.

This genus is isolated in the present fauna, and belongs to a group of forms well represented in tropical Asia, in Madagascar and also in continental Africa, though everywhere in a limited number of species.

The single genera and species of this group bear the characters of archaic relics: many primitive features in venation on one side; highly specialised structures in some other respects, as in the armature of legs and in genital organs of both sexes; black and yellow colour system, which is at the same time an archaic feature and an adaptation to life in wooded land. *Notiothemis* is nearest to *Neodythemis* (from Madagascar) and *Micromacromia* (from continental Africa) in venation, but near *Tetrathemis* (from tropical Asia, Madagascar and Africa) and *Calophlebia* (from Madagascar) in genital structure of male.

Head small; eyes contiguous on a short line. Frons rounded, with no distinct anterior ridge. Vertex broadly rounded, very little emarginate.

Posterior lobe of prothorax moderate, rounded, with a small median notch, ciliate. Thorax comparatively small, legs long and robust. Third femora of male with very numerous—about 40—denticles, triangular in proximal half, gradually passing to quadrangular outline in distal half, a long spine at distal end. Second femora with similar triangular denticles in proximal half, gradually longer spines in distal half. Spines of tibiae numerous, fine. Tarsal claws with robust tooth near the middle.

Abdomen little widened in basal segment, thin, almost cylindrical posteriorly. Male genitalia small. (Female unknown.)

Wings comparatively long and narrow, rather close venation *t* in front wing in same level with *t* in hind wing. Sectors of arculus with long common stalk. Arculus between second and third antecubital. *Cu*<sub>1</sub> in front wing at anal angle of *t*, separate in hind wing. 9–11 *Anq*, the last one complete.

*t* in front wing at level of arculus or very little distal. 1 *Cuq* in front wing, 2 *Cuq* in hind wing. No *Bqs* *t* in front wing free, almost equilateral, distal side but little longer than proximal and costal one. *t* in hind wing free. *ht* crossed in front wing, crossed or free in hind wing. *ti* in front wing free, regular, or its costal side (the second cubito-anal cross vein) not exactly meeting the proximal angle of *t*. *Rs* and *M*<sub>2</sub> very slightly convex; *Rspl* not very distinct; one row of cells *Rs*–*Rspl*. Discoidal field of front wing beginning with one row, two rows at level of bridge, considerably widened to wing's edge; no *Mspl*. In discoidal field of hind wing about four cells running through between *M*<sub>4</sub> and *Cu*<sub>1</sub>. Distinctly developed anal loop in hind wing, with two rows of about five cells each; external angle of loop very obtuse, mostly no interpolated cells. Membranule very small. Pterostigma moderate.

## NOTIOTHEMIS JONESI, n. sp.

S. Afr. Mus.: 2 ♂, M'Fongosi, Zululand (v. 1911, W. E. Jones); 1 ♂, Eldoret, Brit. East Africa (viii. 1913, W. E. Fry). Coll. K. J. Morton: 1 ♂, Bulwa, Usambara.

♂ (M'Fongosi). Labium yellow, median lobe black, also a corresponding narrow, anteriorly convergent stripe over the side lobes. Labrum, face and frons dull yellowish; vertex and a broad basal band of frons metallic blue. Prothorax black, free margin of posterior lobe yellowish green. Thorax brownish black with light green markings and thin whitish pruinosity. Light green: narrow line on median suture; cuneiform antehumeral spots to about mid-height; rather broad band in front of humeral suture, more narrowly continued along ante-alar sinus to median line; indistinct narrow line between humeral suture and metastigma; broad complete band touching metastigma with anterior margin; similar band on posterior half of metepimeron. Ventral surface greenish, sutures lined with fuscous. Legs black, base of first femora greenish internally. Abdomen black with greenish markings: segments 1 lateral spots; 2 lateral spot and two transverse bands; 3 large, anteriorly almost confluent spots in front of, smaller spots behind transverse carina; 4-5 small antero-dorsal, larger medio-lateral spots; 6 very small antero-dorsal spots; 7 complete transverse band of more than one-half the segment's length, very near anterior, more distant from posterior margin of segment; 8-10 wholly black. Ventral surface black, slightly whitish pruinose.

Superior appendages in dorsal view almost parallel, gradually narrowed to end. In lateral view regularly convex, ventral margin slightly projecting beyond the middle, then retracted and again projecting at the end, which is cut obliquely. Apex of inferior appendage corresponding to the shallow incision in ventral outline of the superior. Genitalia of second segment: Anterior lamina small, depressed, finely granulate, with long greyish hairs. Hamule very small, depressed; internal branch a fine acute, moderately bent hook, those of both sides touching each other; external branch shorter, obtusely triangular. Lobe large, free margin directed hindward, cut in a straight line almost vertical to long axis of body.

Wings hyaline; very light yellowish at base, diffusely to level of *t*, colour somewhat deeper in *sc* and *cu*. Pterostigma black.

*Anq.* 9.8; *ht.*  $\frac{1 \cdot 1}{0 \cdot 0}$ . *Abd.* 19, *hdw.* 22, *pt.* > 2 mm.

A specimen from Bulwa, Usambara, is somewhat larger: *abd.* 22, *hdw.* 25, *pt.* 2.5 mm. *Anq.* 11.11; *ht.*  $\frac{1 \cdot 1}{1 \cdot 1}$ . Otherwise identical.

ORTHETRUM (Newman, 1833).

A genus of many species, many of them common and dominant in large parts of the Old World, more common in tropical and sub-tropical than in temperate regions, especially dominant in continental Africa in number of species and of individuals. Species of *Orthetrum* are very wide-ranging (with but a few exceptions): none of those found in the present fauna is limited to South Africa; most of them are known from the entire continent South of the desert belt; two (*chrysostigma*, *trinacria*) are also from Mediterranean Africa and Europe.

They are medium-sized or larger *Libellulinae*; all the species here discussed similar in colours: male pruinose blue with a pattern of black or reddish brown and yellowish, greenish or whitish, often also covered by dense pruinosity in fully mature specimens, in younger individuals similar to females; females not pruinose in most species, in some others only so in very old specimens, with pattern similar to male in principle, but mostly with the dark elements reduced. The condition of these species in collections has long been chaotic; studies by P. P. Calvert and more recently by the writer have established reliable specific characters, and but little uncertainty remains now for some females particularly, or for males in which the genitalia of second segment are not in sufficiently good condition for examination.

The following table was established chiefly on characters of colour and pattern. For certain identification the study of genital structures on second abdominal segment of males is always useful, often necessary, and the figures given for those structures are indispensable in addition to the table.

1. Basal segments of abdomen much widened in lateral and especially in dorso-ventral dimension; segment 3 constricted, following segments comparatively narrow, fusiform or almost parallel in males, cylindrical in females . . . . . 2.
- Basal segments of abdomen not widened in lateral, very little in dorso-ventral dimension; segment 3 comparatively broad, not constricted; following segments very gradually narrowed to end of abdomen and depressed in male, less distinctly narrowed, more cylindrical in female.
- Ante-nodal cross-veins in sub-costal space of ambiguous colour, blackish in dorsal view, ochreous if seen from the sides. Pterostigma very large, ochreous or light ferruginous between black veins. Membrane whitish or light grey. Base of wings hyaline with no trace of yellow spot. Adult ♂ with face fuscous, frons above shining black; thorax and dorsum of abdomen (entirely or to segment 6) with very dense whitish blue pruinosity; terminal abdominal segments black with a mid-dorsal, basal, cuneiform ochreous spot on segment 6-7 (similar spots on

more anterior segments in immature specimens). Female with face and frons dull olivaceous, a narrow medially interrupted black basal line of frons. Thorax olivaceous, sides yellowish; light yellowish mid-dorsal longitudinal band from prothorax to inter-alar space; one or two incomplete dark lines each side between this band and humeral suture. Abdomen dull ochreous; continuous, more rarely interrupted, lateral black bands from segments 2 to 10, distant from lateral carina not fully by its own breadth. Tips of wings brown to distal end of pterostigma. ♂, *Abd.* 28, *hdw.* 33, *pt.* < 4 mm. ♀, 27, 30, 4 . . . . . *O. farinosum*.

2. Ante-nodal cross-veins in sub costal space ochreous or whitish. Pterostigma light coloured . . . . . 3.  
 Ante-nodal cross-veins in sub-costal space black. Pterostigma of mature specimens very dark ferruginous or almost black. Membranule black. Basal spot in base of sub-costal and cubito-anal space and along membranule, golden yellow to brown in male, lighter yellow in female. Thoracic pattern of non-pruinose males two dorsal and five lateral about equally developed black stripes on uniformly greenish ground, of females similar, but with reduction of black area, especially at the sides. Abdominal pattern of non-pruinose males transverse median ochreous or olivaceous bands on segments 4-6, very variable in extent; similar in females, but with light-coloured area more extended, especially along mid-dorsal line; terminal abdominal segments wholly black in mature specimens of both sexes. Males pruinose blue first on abdomen, later on thorax, leading in some very mature specimens to the disappearance of every trace of pattern. Frons greyish olivaceous, darker in male, with basal black line, broader in male, narrow in female. ♂, *Abd.* 28, *hdw.* 32, *pt.* < 3 mm. ♀, 29, 32, 3 . . . . . *O. stemmale capense*.
3. Abdominal pattern in non-pruinose males and in females a mid-dorsal longitudinal black band, widened at the joints. Pterostigma large. *Cu*<sub>1</sub> in hind wing regularly separated from anal angle of *t* . . . . . 4.  
 No mid-dorsal longitudinal black band on abdomen. *Cu*<sub>1</sub> in hind wing but occasionally separated from anal angle of *t* . . . . . 5.
4. Large species. Wings hyaline at base. Pterostigma very light yellow, almost whitish. Lips, face and frons greenish white; narrow basal black line on frons. Thorax olivaceous dorsally, light greenish at sides; median and incomplete antehumeral stripes fuscous, narrow black lines in humeral and second lateral sutures. On abdomen besides mid-dorsal also lateral black bands, narrowed or almost interrupted in median third of each segment.  
 Female with foliaceous dilatations of segment 8 very narrow and appendages comparatively long. Mature males pruinose on abdomen to the disappearance of pattern, less densely on thorax. ♂ ♀, *Abd.* 36, *hdw.* 34, *pt.* 3.5 mm. . . . . *O. trinacria*.  
 Smaller species. Wings in male hyaline or with golden yellow spot at base, in female with golden yellow spot of various extent, sometimes to level of *Cu*<sub>1</sub> and apex of membranule. Pterostigma bright ochreous. Labium yellow with median black band; face and frons yellowish; broad basal black band on frons and sometimes more black on anterior

ridge or anterior flattened spaces of frons. Thorax yellowish with broad, deep black stripes; median, ante-humeral, humeral on suture; narrow black lines between humeral suture and metastigma, above metastigma and on second lateral suture. Mid-dorsal black band on abdomen comparatively broader than in last species; no lateral black bands, only narrow black lining of lateral carinae; ventral surface black. Female with foliaceous dilatation of eighth segment broader and appendages short. Mature males pruinose to disappearance of pattern first on abdomen, finally also on thorax. ♂, *Abd.* 29, *hdw.* 29, *pt.* 3.5 mm. ♀, 28, 30, 4

*O. icteromelas.*

5. Almost regularly two rows of cells between *Rs* and *Rspl*, at least for a short space . . . . . 6.  
Regularly but one row of cells between *Rs* and *Rspl*. Abdominal pattern of non-pruinose males and of females consisting of broad lateral continuous black bands. Pterostigma large, light yellowish between black veins . . . . . 8.
6. Abdominal pattern of non-pruinose males consisting of lateral black bands, complete or not fully touching lateral carinae or even interrupted in middle of segments, of females similar but reduced in various degrees and almost regularly interrupted . . . . . 7.  
Abdominal pattern of non-pruinose males and of females similar to *O. stemmale capense*; on segments 3-7 broad median transverse yellowish bands, interrupted by a narrow mid-dorsal black line, almost regularly extended narrowly along that line to anterior margin of segments. Thoracic dorsum greenish or olivaceous; a mere vestige of blackish on median suture, incomplete ante-humeral and humeral blackish lines; sides with four dark lines of variable development; in specimens in perfect condition of colours two broad bands whitish (or lighter greenish than rest of sides), mesepimeral and metepimeral, gradually obscured from ventral to dorsal margin. Lips yellowish, often with median lobe of labium dark. Face and frons light olivaceous, very narrow basal black line on frons. Pterostigma light yellow between black veins, the costal one mostly thickened. Variable golden yellow spot on base of hind wings to apex of membranule. Mature males mostly pruinose on abdomen and thorax to the complete disappearance of pattern. ♂, *Abd.* 31, *hdw.* 33, *pt.* > 3 mm. ♀, 31, 32, 3 . . . . . *O. brachiale.*
7. Thoracic sides with two distinct whitish stripes; immediately behind humeral and second lateral sutures; these stripes most distinct at ventral end, where they are lined with blackish, gradually darkened to dorsal end. Thorax otherwise olivaceous, shading to ferruginous, a mere vestige of blackish on median suture and an incomplete ante-humeral blackish line, which is accompanied (at least in part of specimens) medially by a third somewhat diffused whitish stripe. Lateral abdominal black bands narrow and sometimes interrupted in males, very narrow and often indistinct in females, when the abdomen appears ferruginous almost without markings. Face and frons olivaceous with very narrow black basal line. Pterostigma shorter and narrower than in following species, ferruginous. Small golden yellow basal spot at membranule of

hind wing. Pruinosity of male appearing early on abdomen, very late on thorax. ♂, *Abd.* 31, *hdw.* 33, *pt.* 3 mm. ♀, 27, 31, 3. *O. caffrum*. Thoracic sides with but one distinct whitish stripe, behind humeral suture, lined with black in ventral half and gradually obscured dorsally. Thorax otherwise similar to preceding species, only there is no trace of a dorsal black stripe and the general colour has more of greenish and less of ferruginous shade. Lateral abdominal black bands broad and complete in male; narrow and not touching lateral carina in middle of segments, but often not interrupted in female. Face and frons as in preceding species. Pterostigma longer, broader and generally lighter in colour as in preceding species. Base of wings similar. Pruinosity of male as in preceding species. ♂, *Abd.* 29, *hdw.* 30, *pt.* > 3 mm. ♀, 27, 29, > 3. *O. chrysostigma*.

8. Slightly larger species. Male with internal and external branch of humule of about equal length. Thoracic pattern in mature but not yet extremely pruinose males an ante-humeral and two lateral greenish stripes on black ground; in female black colour much reduced, to vestige of a line at median suture, incomplete ante-humeral and humeral and parts of 4 to 5 lateral lines. In immature males, and especially females, the sides are wholly greenish yellow with at most vestiges of black lines. Frons dull olivaceous to bluish grey in mature males, greenish yellow in females, with black basal line, broader in males. ♂, *Abd.* 28, *hdw.* 29, *pt.* 3 mm. to 33, 33, 3.5. ♀, 25, 28, 3 to 31, 32, 3.5. *O. guineense*. Smaller species and smallest *Orthetrum* of the present fauna. Internal branch of hamule in male decidedly longer than external branch, Thoracic pattern in mature, even fully pruinose males somewhat variable and with irregular light green spots; at dorsal end of mesepimeron, dorsally and ventrally from metastigma on metepisternum, posterior and dorsal half of metepimeron. Female very similar to preceding species, not always readily distinguishable, the differences being only relative; smaller size and still more reduced dark colour on thorax, the lines being mostly indicated by faint vestiges only. Face and frons whitish in male, light yellowish in female; basal black line of frons broad; not rarely fine black lines on anterior ridge of frons end around anterior flattened spaces. ♂ ♀, *Abd.* 29, *hdw.* 30, *pt.* 3 mm. *O. Abbotti*.

#### ORTHETRUM TRINACRIA, Sclys, 1841.

S. Afr. Mus.: 1 ♀, Johannesburg, Transvaal (C. H. Peard); 1 ♀, Lorenzo Marques (12. xii. 1911).

This largest species of *Orthetrum* known from the present fauna is easily identified by its abdominal pattern, and when pruinose, by the large whitish pterostigma, hyaline base of wings, very elongate abdomen with basal segments much inflated. The species was first discovered in Sicily, but it seems that it has not been obtained again from this European island for the last seventy years. It is probably most frequent in desert regions such as Mediterranean Africa and



Abyssinia; evidently it is not a common species in the South African fauna.

ORTHETRUM ICTEROMELAS (Ris, 1909).

S. Afr. Mus.: 1 ♀, Boksburg, Transvaal. Brit. Mus.: 1 ♂, 2 ♀, Boksburg, Johannesburg (C. H. Peard). Coll. E. B. Williamson: 3 ♂, 2 ♀, Salisbury, Mashonaland (ii. 1900, Marshall).

Similar in general form and size and also the large, bright yellowish pterostigma to *O. guineense*, *Abbotti* and *chrysostigma*. Of this group the pterostigma is generally largest in *icteromelas*, smallest in *chrysostigma*. Females and non-pruinose males are easily identified by the abdominal pattern; pruinose males, although very closely resembling the above-named three species, especially *guineense*, are

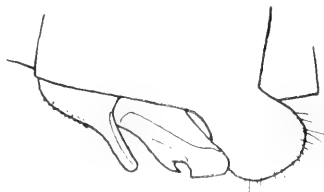


FIG. 69.—*Orthetrum icteromelas*, ♂. Salisbury. Genitalia, second segment, left side view.

unmistakable when the peculiar hamuli are in good position for examination.

ORTHETRUM CAFFRUM (Burmeister, 1839).

S. Afr. Mus.: 3 ♀, Burghersdorp, Cape, Worcester; 1 ♂, 1 ♀, M'Fongosi, Zululand (v. 1911, W. E. Jones); 1 ♂, Rietfontein, Pretoria District (2. x. 1904); 2 ♂, 3 ♀, Eldoret, Brit. E. Africa (viii. 1913, W. E. Fry); Acornhoek, Transvaal (xii. 1918, Tucker); Grootfontein and Otjituo, S.W. Protectorate (i. 1920, Tucker). Brit. Mus.: 1 ♂, Mahakata River, Gazaland (24. ix. 1905, Marshall); 1 ♀, Johannesburg (H. Crawford-Cruger); 1 ♂, Zululand (Rev. W. H. Heale); 1 ♂, Willow Grange, Mooi River, Natal (? . ii. 1913, R. C. Wroughton). Coll. E. B. Williamson: 1 ♂, 1 ♀, Salisbury, Mashonaland (iii. 1900, v. 1905, Marshall); 1 ♂, Hilton Road, Natal (23. xii. 1909, G. F. Leigh). Mus. Stockholm: 1 ♀, Cap. b. Spei (Wahlberg).

The thoracic pattern of two lateral and often also an ante-humeral whitish stripe is a conspicuous and regular character of this species.

It is somewhat more robust in stature than the group *chrysostigma-guineense-Abbotti*, though being often smaller in dimensions than *chrysostigma*. Its reticulation is closer (regularly two rows *Rs-Rspl*) and its pterostigma smaller than in those related species. Males with the thorax entirely pruinose to disappearance of the whitish bands are not often met with; they may easily be identified by the peculiar shape of hamuli (Text-fig. 70).

This species is East African (North to Abyssinia) and South African; specimens formerly recorded (by the writer) from some West African stations very probably do not belong to *O. caffrum*, but to *O. microstigma*, an essentially tropical and chiefly West African species, which was not recognised when the group was first studied for the monograph. A very close ally of *O. caffrum* is *O. taeniolatum* found in Somaliland and Eritrea, Mediterranean Asia and India.

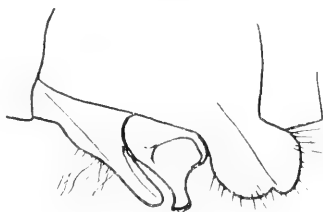


FIG. 70.—*Orthetrum caffrum*, ♂. M'Fongosi. Genitalia, second segment, left side view.

#### ORTHETRUM CHRYSOSTIGMA (Burmeister, 1839).

S. Afr. Mus.: 1 ♂, 2 ♀ (no locality); 1 ♂, Livingstone, Zambesi; 1 ♂, Matopo, Rhodesia (28. v. 1911, C. H. Peard); 1 ♂, 1 ♀, Lorenzo Marques (26. v. 12. xii. 1911); 1 ♂, M'Fongosi, Zululand, (W. E. Jones); 3 ♂, Barberton, Transvaal. Whole of Cape Colony and South West Africa. Brit. Museum: 1 ♂, Salisbury, Mashonaland (iv. 1904, Marshall). Coll. K. J. Morton: 3 ♂, 1 ♀, Umtali, Rhodesia (19. 21. viii, 7. ix. 1908, Miss Fountaine). Coll. Ris: 2 ♀, Lorenzo Marques (29. ix, 15. xii. 1911). Coll. E. B. Williamson: 10 ♂, 11 ♀, Salisbury, Mashonaland (i, ii, iii. 1900, iv. 1905, Marshall); 4 ♂, Natal (G. F. Leigh); 1 ♂, Princetown, Natal (19. ii, 1909, *id.*).

The mesepimeral whitish stripe is a good guide for the identification of this species, as first indicated by P. P. Calvert. The pterostigma is rather variable in size, but almost regularly smaller than in *guineense*, *Abbotti* and *icteromelas*, larger than in *caffrum*, in colour entirely between the bright yellowish shades of the former three and the more ferruginous colour of the latter species. Females of *chrysostigma*,

*guineense* and *Abbotti* are sometimes not easily distinguished: as a rule *chrysostigma* is the largest of the three, has almost regularly two rows *Rs-Rspl* at least for a few cells' length, has the pterostigma smallest and lateral black bands on abdomen reduced, often interrupted; in mature colour and good condition the mesepimeral whitish stripe is a fairly constant character also for the female of *chrysostigma* (Text-fig. 71).

This species, first described from the Canary Islands, is found throughout the African Continent from Algeria to Natal, also in the

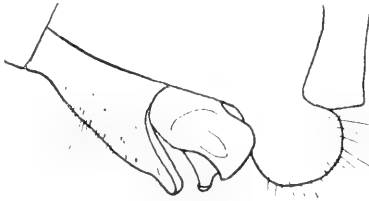


FIG. 71.—*Orthetrum chrysostigma*, ♂. Barberton. Genitalia, second segment, left side view.

extreme south of Europe and in part of Mediterranean Asia. There is no other than individual variability recognisable. When working out *Orthetrum* for the *Libellulinae* monograph, the writer supposed the two following forms to be geographical sub-species of *chrysostigma*; but more extensive materials and more careful study of the matter made this view untenable, and a new arrangement (like the one given here) is adopted for the additions to the monograph.

#### ORTHETRUM ABBOTTI (Calvert, 1892).

S. Afr. Mus.: 3 ♂, 3 ♀, and 2 ♂ ♀, *in cop.*, M'Fongosi, Zululand (ii, iii. 1912, W. E. Jones). Brit. Mus.: 1 ♀, Willow Grange, Mooi



FIG. 72.—*Orthetrum abbotti*, ♂. M'Fongosi. Genitalia, second segment, left side view.

River, Natal (9 . ii . 1913, R. C. Wroughton). Coll. Ris: 1 ♂, Botchabelo, 1200 m., Transvaal (23 . ii . 1914, H. Junod).

Extremely similar to following species in abdominal pattern, large, bright yellowish pterostigma and general outline; but different by

hamuli of male, thoracic pattern of pruinose males and generally smaller size (Text-fig. 72).

First described from East Africa (Kilimandjaro), and probably most developed in that region; but specimens examined by the writer from the Belgian Congo, Kamerun and Sierra Leone give it a much wider range, similar to the habitat of the following species.

#### ORTHETRUM GUINEENSE (Ris, 1909).

S. Afr. Mus.: 1 ♂, M'Fongosi, Zululand (xi. 1911, W. E. Jones); 1 ♂, Umhlali, Natal (i. 1913, K. H. Barnard). Coll. E. B. Williamson: 1 ♂, Salisbury, Mashonaland (iv. 1905, Marshall); 1 ♀, Umtali, 3700 ft., Mashonaland (xii. 1900, *id.*); 2 ♂, 5 ♀, Natal (G. F. Leigh); 1 ♂, 1 ♀, woodside off Umbilo Road, Congella, Natal (19. x. 1904; 17. i. 1905, *id.*).



FIG. 73.—*Orthetrum guineense*, ♂. M'Fongosi. Genitalia, second segment, left side view.

The specimens here recorded (and described in table, p. 394) agree perfectly with the type series of *O. guineense* as described from Angola and other parts of equatorial West Africa. The chief distinctive character is the hamule of males. But this structure is subject to misleading differences in position in this species more than in the others here discussed, and careful examination is often necessary. Differences in colour and pterostigma are extremely slight in comparison with *O. Abbotti*, not even considerable with many specimens of *chrysostigma*. The hamule is nearest *O. stemmale capense*, and extremely old and obscured specimens may resemble this species in colour of body and basal spot in hind wing (though not easily in pterostigma).

A series of specimens mentioned and described under *guineense* (from the Sclysian Collection and Stockholm Museum) in the additions to my Libellulinae monograph is purposely omitted here, as its identification is somewhat doubtful and the specimens are no more at hand.

As far as our experience goes, the area of *guineense* is much the same as that of *Abbotti*, but the latter seems chiefly eastern, the former western in distribution.

ORTHETRUM BRACHIALE (Palisot de Beauvais, 1805).

S. Afr. Mus.: 1 ♀, Lorenzo Marques. Mus. Hamburg: 1 ♂, Lorenzo Marques (17. ix. 1911, Michaelsen). Coll. Ris: 1 ♀, Rikatta, Delagoa Bay (iv. 1914, H. Junod). Coll. E. B. Williamson: 3 ♂, 1 ♀, Salisbury, Mashonaland (iv. 1905, Marshall).

Generally larger than the species of the *chrysostigma* group, which it resembles by the mostly rather light coloured pterostigma; anterior vein of pterostigma conspicuously thickened in *brachiale* more often than in any other species of the group. Abdominal pattern much as in *stemmale capense*, but with black elements reduced; the

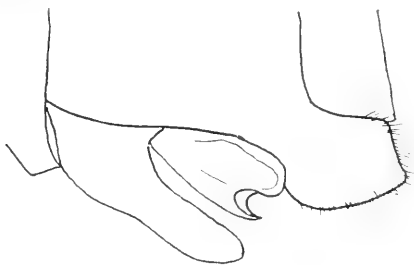


FIG. 74.—*Orthetrum brachiale*, ♂. Lorenzo Marques. Genitalia, second segment, left side view.

same may be stated for the thoracic pattern, at least for specimens in which the two broad lateral light-coloured stripes are obliterated by age or destroyed by decomposition. The excellent group character (first applied by P. P. Calvert) of colour of ante-nodal cross-veins in sub-costal space is often treacherous in *O. brachiale* (also sometimes in *guineense* and even in *chrysostigma*), where mature specimens not rarely have those veins much obscured, although they are conspicuously whitish in less mature specimens. For males the quite peculiar form of hamuli is a guide in any case (Text-fig. 74).

*O. brachiale* is chiefly an inter-tropical species, found about equally in Western and Eastern regions of the African continent, also in Madagascar and some of the smaller islands.

ORTHETRUM STEMMALE CAPENSE (Calvert, 1893).

S. Afr. Mus.: 2 ♂, 5 ♀, Lorenzo Marques (ix, xi, xii. 1911); 6 ♂, 8 ♀, M'Fongosi, Zululand (ii, iii, v, xi. 1911, W. E. Jones); 13 ♂,

1 ♀, Barberton, Transvaal; 1 ♀, White River, East Transvaal (9 . xii . 1909, A. T. Cooke); 1 ♂, Groenvleikloof, Pretoria District (6 . i . 1907). Brit. Mus.: 1 ♀, Chirinda Forest, 4000 ft., Gazaland (18 . x . 1905, Marshall); 1 ♂, 1 ♀, Mazoe, 4000–4300 ft., Mashonaland (29 . x, 24 . xii . 1905, *id.*); 2 ♂, Natal. Coll. K. J. Morton: 1 ♂, 1 ♀, Macequece (25 . ix, 8 . xi . 1908, Miss Fountaine); 1 ♂, 1 ♀, Eshowe, Zululand (27 . ii, 5 . iii . 1908, *ead.*); 2 ♂, 3 ♀, Durban, Natal (30 . xi, 26 . xii . 1907; 20, 27 . i . 1908, *ead.*); 1 ♀, Wolhuterkop, Transvaal (i . xii . 1908, *ead.*). Coll. Ris: 4 ♂, 2 ♀, Lorenzo Marques (14 . iii, 6, 14, 15 . xii . 1911); 2 ♀, Rikatla, Delagoa Bay (ii . 1914, H. Junod). Coll. E. B. Williamson: 3 ♂, 6 ♀, Natal (G. F. Leigh); 2 ♀, Hilton Road, 4 ♂, 2 ♀, Princeton, 4 ♂, 7 ♀, woodside off Umbilo Road, Congella, all in Natal (12 . x . 1904; 10 . i . 1905; 18, 23 . xii . 1908; 18, 19 . ii . 20; xii . 1909; 17 . ii . 1910, *id.*).

Similar in general outline to *O. brachiale*, wings somewhat more

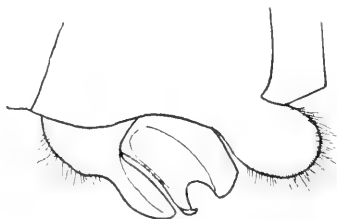


FIG. 75.—*Orthetrum stemmale capense*, ♂. M'Fongosi. Genitalia, second segment, left side view.

rounded, most often a single row of cells *Rs-Rspl*. Though analogous to *brachiale* in elements of pattern, this species is darker in every respect, and the darkest of the pruinose blue African species of *Orthetrum*. Black colour in female and non-pruinose male almost equally light-coloured area, or surpassing it in many males; pterostigma regularly very dark brown or blackish in mature specimens; ante-nodal cross-veins in sub-costal space black even in very immature examples; basal spot in hind wings mostly darker in mature specimens than in other species (some isolated specimens of *guineense* excepted), deep golden brown to almost blackish and not rarely pruinose in very mature males; golden yellow in females; not rarely females with yellowish colour of base diffusely extended to level of triangles and even more distally. Hamuli nearest *O. guineense*, but internal branch more slender and excision between the two branches not so deep.

A very common species in equatorial Africa, West and East

(western forms generally darker in colour), South to Natal, North to Eritrea. Representative forms in Madagascar and the smaller islands.

ORTHETRUM FARINOSUM (Forster, 1898).

S. Afr. Mus.: 2 ♂, Dunbrody (6 . ii. 1912); 1 ♂, Matopo (E. C. Chubb); 1 ♀, Waterval, Zoutpansberg District, Transvaal (13 . xii. 1899). Coll. K. J. Morton: 3 ♀, Durban, Natal (13 . xii. 1907, 27 . i. 1908, Miss Fountaine). Brit. Mus.: 1 ♀, Mpudzi River, Manica (26 . x. 1901, Marshall). Coll. Ris: 1 ♀, Botchabelo, 1200 m., Transvaal (18 . ii. 1914, H. Junod). Coll. E. B. Williamson: 1 ♀, Salisbury, Mashonaland (ii . 1900, Marshall); 1 ♂, 1 ♀, Princetown, Natal (18 . ii. 1909, G. F. Leigh).

The male of this species resembles superficially the European *O. brunneum* by the comparatively broad and depressed abdomen with base but little widened, and by the very light shade of its blue



FIG. 76.—*Orthetrum farinosum*, ♂. Dunbrody. Genitalia, second segment, left side view.

pruinosity. The female is easily recognised by the analogous characters of abdomen, by the large, light-coloured pterostigma and conspicuously brownish tips of wings, as well as by the lateral abdominal blackish lines a little distant from the lateral carinae, and thus producing a pattern of marginal lunules, somewhat similar to the European *O. cancellatum*.

Not a common species, but very widely distributed in Eastern Africa from Egypt (Cairo) to Natal, and also found in West African stations (Sierra Leone, Kamerun and the Congo).

PALPOPLEURA (Rambur, 1842).

A genus of comparatively small to very small forms, conspicuous by coloured wings, short depressed abdomen and the curious sinuate course of the costal vein in its ante-nodal part. One of its species is certainly a characteristic insect of the Ethiopian faunal region, and present practically in every collection brought from inter-tropical

Africa; others are either more local or much less commonly distributed in their habitat.

Systematically this genus is part of a small group of forms, interesting for its geographical distribution. Old-world species are Ethiopian, except one, which occurs in parts of India, in Assam, Indo-China and South China. But a more numerous group is American (*Diastatops*, *Zenithoptera*, and of very probable affinity also is *Perithemis*). Forms common to the Ethiopian and Neotropical regions have been discussed in interesting zoo-geographical speculations by v. Thering for instance, and amongst such forms the *Palpopleura*-group of *Libellulinae* may be cited as a conspicuous example.

1. Thoracic sides predominantly yellow. Face very light yellow or olivaceous in both sexes . . . . . 2.

Thoracic sides predominantly black or blackish fuscous, with two very oblique stripes, light yellow to dark bluish grey in mature males. Face dark brown to blackish in males, ferruginous in females. Males with frons above brilliant metallic blue; dorsum or thorax and abdomen pruinose blue. Males (a. *lucia*) with front wings metallic black over entire breadth to about middle of pterostigma to tip in costal space; hind wings similarly coloured, but the coloured area ending in a sinuate line at variable distance (for instance, between two and three cells' breadth) from the anal margin. Other males (b. var. *portia*) with black colour in front wings not reaching anal margin, only approaching it in level of *t* and between nodus and pterostigma, thus roughly forming a broad costal stripe with two transverse bands of black. Females with black pattern similar to second form of male, but having the second transverse black band slightly more proximal, with about equal parts proximal and distal to nodus; base of both wings yellow, from a very light shade to deep golden yellow, distally to end of second black band. Frons ferruginous; abdomen ochreous with three longitudinal sinuate black bands.

♂ (*lucia*), *Abd.* 15, *hdw.* 21, *pt.* 3.5 mm. to 19, 25, 4.

♂ (*portia*), *Abd.* 14, *hdw.* 18, *pt.* 3 mm. to 19, 23, 3.5. ♀, 12, 18 > 3 to 16, 25, 4. . . . . *P. lucia*.

2. Smallest species. Legs mostly light yellow, black lines internally in males much reduced in females. Males with both wings black at base, mostly to distal end of triangles and two or three rows of cells beyond anal vein, the black area longitudinally divided by a hyaline or yellow stripe in *m* and space between *R* and *M*<sub>1+2</sub>; veins in black space light yellow; small black dot at nodus of front wings; base of wings otherwise yellow to nodus in front wing, almost to pterostigma in hind wing; from very light shades to rather deep golden yellow. Wings of female similar at base, distally with variable transverse black bands; with proximal margin at nodus in front wing, one or two cells distally in hind wing; yellow colour mostly deeper than in males, but concentrated in broad borders to the black basal spots and distal bands. Dorsum of abdomen



pruinose blue in male, ochreous with three longitudinal black lines in female. ♂, *Abd.* 13, *hdw.* 16, *pt.* 2 mm. to 16, 19, 2.5. ♀, 13, 18, 2.5.

*P. jucunda.*

Larger species. Legs black, first femora yellowish internally. Infrac-tion in costal vein not so deep as in other species. Males with a radiate pattern of deep black; in front wing stripe in *sc* to 6th-8th *Ang.*, stripe in space between  $M_{13}$  and  $M_4$  to distal end of *t*, large spot of about four cells at nodus; in hind wing only a small sub costal stripe to *Ang* 2; costal space of front wings yellowish to tip, this colour deeper in post-nodal part. Females with similar pattern of black, but reduced in all its components. Dorsum of abdomen pruinose blue in male, olivaceous, with three longitudinal black lines in females. ♂, *Abd.* 19, *hdw.* 26, *pt.* 3 mm. ♀, 19, 27, 4 . . . . . *P. deceptor.*

#### PALPOPLEURA LUCIA (Drury, 1773).

S. Afr. Mus.: 5 ♂, 2 ♀, Lorenzo Marques (7, 20.v, 26.ix, 3.x, 1.vii.1911); 2 ♂, 3 ♀, M'Fongosi, Zululand (ii, iii, iv.1911, W. E. Jones). Coll. Ris: 11 ♂, 9 ♀, Lorenzo Marques (6.xi.1910; 17, 18.i, 10.ii, 11, 14, 24.iii, 5, 7, 11.v.1911); 4 ♀, Rikatla, Delagoa Bay (iii, iv, 17.iv, 10.v.1914, H. Junod). Coll. E. B. Williamson: 5 ♂, 1 ♀, Natal (G. F. Leigh); 2 ♂, 1 ♀, Princetown, Natal (7, 14.ii.1909, 21.ii.1910, *id.*); 1 ♂, woodside off Umbila Road, Congella (20.x.1904, *id.*); 1 ♀, Hilton Road (23.ii.1909, *id.*).

♂ *portia*: S. Afr. Mus.: 9 ♂, M'Fongosi, Zululand (ii, iii, iv.1911, W. E. Jones). 1 ♂, Otavi, S.W. Africa (i.1920, Lightfoot). Coll. E. B. Williamson: 11 ♂, Princetown, Natal (12.xii.1908; 7, 18.ii, 11.iii.1909; 24.ii.1910, G. F. Leigh).

The *portia* forms were first introduced by the writer as male varieties; formerly *portia* had been considered as a distinct species. The reasons why this view was abandoned were chiefly given by the existence of intermediate forms, which, though rather scarce in collections from various parts of Africa, intergrade almost completely between extreme *lucia* and extreme *portia* pattern. Nevertheless the question still remains open; it cannot be resolved in museums but only by exact observations in the field. Females also intergrade between forms with very little yellow at base of wings and extremes with both wings deep golden yellow to distal limits of dark pattern. The deeper-coloured females are apparently more often associated with *lucia* males, the lighter ones with the *portia* form. But there are exceptions, and a clear separation is still more difficult for females than for males. Geographically it might appear that *lucia* is more the form of low levels and very hot districts, *portia* of the opposite conditions, but

here, too, there is no certainty, and many exceptions occur in the material examined by the writer.

*PALPOPLEURA JUCUNDA* (Rambur, 1842).

S. Afr. Mus.: 1 ♀, Rietfontein (13. x. 1904); 1 ♂, 1 ♀, Waterval (16, 17. xi. 1900); 7 ♂, 12 ♀, M'Fongosi, Zululand (ii, iv. 1911, W. E. Jones); 1 ♂, Machava, Delagoa Bay (14. xi. 1911), Waterberg, S.W. Protectorate (ii. 1920, Tucker). Coll. E. B. Williamson: 9 ♂, 8 ♀, Salisbury, Mashonaland (v, vi. 1899; ii, iii. 1900; v. 1905, Marshall). Coll. Ris: 1 ♂, 4 ♀, Botchabelo, 1200 m. (18, 23. ii. 1914, H. Junod). Brit. Mus.: Knysna, Delagoa Bay, Pretoria.

This elegant little dragonfly is one of the characteristic species of the present fauna. There is some variability in the single elements of wing pattern in both sexes, though the pattern remains the same in principle. Its range in Africa is very wide, since it has been recently found in Abyssinia (though in a slightly different form, with considerable reduction of black colour on wings, especially in male), and also in the interior of Nigerian West Africa. A closely allied though distinct species is found in India and South China.

*PALPOPLEURA DECEPTOR* (Calvert, 1899).

Coll. E. B. Williamson: 1 ♂, Salisbury, Mashonaland (xi. 1900, Marshall). Coll. Selys: 3 ♀, Delagoa Bay.

Somewhat different in facies from the other species of *Palpopleura*, by the relatively longer and more slender abdomen, more elongate wings with the wave in costal vein only faintly indicated; but otherwise in venational and structural characters and colour system clearly congeneric. Evidently of wide distribution though rare in collections, and probably to be found more in the interior of the continent than on the coast districts; found North of Khartoum, West of Sikasso and Zungeru.

*CHALCOSTEPHIA* (Kirby, 1889).

A genus containing only two forms, which were considered as subspecies by the writer in his *Libellulinae* monograph, one (the first described) from Madagascar, the other one from continental Africa. Conspicuous by its short abdomen and elongate, comparatively narrow wings; a remarkable feature of its venation is the position of the proximal side of triangle in hind wing distal to arculus. Male distinguished by ventral process of first abdominal segment.

*CHALCOSTEPHIA CORONATA FLAVIFRONS* (Kirby, 1889).

S. Afr. Mus.: 1 ♂, Lorenzo Marques (4. xii. 1911). Coll. E. B. Williamson: 1 ♂, 1 ♀, Natal, woodside off Umbilo Road, Congella (22. x. 1904, G. F. Leigh).

♂. Labium ochreous; labrum and face light yellowish to rather bright orange; frons above brilliant metallic green. Thorax and abdomen entirely light blue pruinose (with pattern similar to female in immature specimens). Ventral plate of first abdominal segment raised in an almost vertical, deeply furcate process. Wings hyaline, tips narrowly bordered with brown. Pterostigma ferruginous in central, diffusely dark brown in peripheral parts.

♀. Thoracic dorsum black with greenish-yellow markings: slightly diffuse line at median suture; broad almost quadrate spot in front of ventral half of humeral suture, narrow line at superior half of same suture and along ante-alar sinus. Sides greenish yellow with black lines at metastigma, second lateral suture and latero-ventral margin of metepimeron. Legs black. Abdominal segments 1-2 greenish yellow with black rings at transverse carinae; 3-7 black with greenish or yellowish lateral spots, large on 3, small and interrupted on 4-5, none on 6, small and rounded on 7; 8-10 black. Margin of eighth segment folded; vulvar scale small, triangular. Wings as in male.

♂, *Abd.* 24, *hbw.* 28, *pt.* 2.5 mm. ♀, 22, 29, 2.5.

Found in tropical Africa, East and West, but evidently not a common species.

*HEMISTIGMA* (Kirby, 1889).

Like the preceding genus, consisting of two forms, one continental, the other one from Madagascar.

*HEMISTIGMA ALBIPUNCTA* (Rambur, 1842).

S. Afr. Mus.: 12 ♂, 7 ♀, Lorenzo Marques (24, 25, 27. ix, 15. x, 29. xi, 3, 4, 5. xii. 1911); 6 ♂, 10 ♀, Barberton, Transvaal. Coll. Ris: 4 ♂, 4 ♀, Lorenzo Marques (10, 11, 17, 25. iii. 1911); 3 ♂, 1 ♀, Rikatla, Delagoa Bay (i. x. 1913, H. Junod). Coll. E. B. Williamson: 3 ♂, Natal, woodside off Umbilo Road, Congella (12. x. 1904, G. F. Leigh).

♂. Lips and face whitish yellow; frons brilliant metallic blue with two whitish lateral spots. Thorax pruinose blue, sides with variable pattern of light yellow; in most specimens, even when fully mature, there remain of this colour three spots, confluent or separated, on ventral half of mesipimeron, metepisternum and metepimeron

respectively. Legs black. Abdomen slender, slightly fusiform, pruinose blue. Immature specimens with pattern of female. Wings hyaline; a costal stripe, distally to pterostigma, yellowish, mostly deeper in colour between nodus and pterostigma; in sub-costal space of front wings a deep black stripe of variable length (4 to 8 cells, very rarely reduced to a vestige), exceptionally a similar but smaller stripe in space between  $M_{1-3}$  and  $M_4$ . Pterostigma large, sharply divided in a proximal white and a distal black part, the latter slightly the longer.

♀. Frons fuscous with median transverse whitish-yellow band. Thoracic dorsum dark brown with somewhat diffuse yellowish lines; broad at median, narrow at humeral suture. Sides light greenish yellow with narrow, interrupted blackish lines between humeral suture and metastigma, at metastigma and at second lateral suture. Abdomen ochreous with three longitudinal black bands: median one beginning as a narrow line, gradually widened to end; lateral ones of equal breadth throughout, touching lateral margins of segments from segment 5 backward. Vulvar scale erect, elliptical in outline, about half as long as ninth segment. Wings mostly diffusely yellowish besides yellow costal stripe; no sub-costal black stripe; tips of all wings deep brown in variable length, mostly to about middle of pterostigma.

♂, *Abd.* 21, *hdw.* 23, *pt.* < 3 mm. to 25, 30, 4. ♀, 21, 24, 3 to 24, 29, < 4.

Very widely distributed in tropical Africa (North to Bahr el Ghazal) and often common; evidently a very common species at Delagoa Bay.

#### PORPAX (Karsch, 1896).

Similar in outline to *Chalcostephia*, but abdomen much narrower, especially in male. Only genus of present fauna with arcus at second *Anq* or distal thereto combined with incomplete last *Anq*. Most specimens with 2 *Cuq* in hind wing. Superficially resembling also *Diplacodes*, but wings more elongate and venation more close, besides differences in many venational details. The affinities are evidently with *Chalcostephia*, *Hemistigma* and *Thermochoria*. Only one species known.

#### PORPAX ASPERIPES (Karsch, 1896).

Brit. Mus.: 1 ♀, Mashonaland, up Buzi River, Gazaland (25. ix. 1905, G. A. K. Marshall).

This single specimen is not in very good condition; somewhat

different from those originally described from equatorial West Africa (pterostigma larger; cross-veins in sub-costal space yellow instead of black; yellow on thorax and abdomen more extended), it might belong to a second species. But it does not seem advisable to name a form from a single immature female.

♀ (immature). Labium light yellow, a very broad black median band. Labrum yellow, black at anterior margin. Anteclypeus brown, postclypeus light yellow. Frons black anteriorly, light yellow with broad black basal line above. Vertex black, light yellow above. Thoracic dorsum black with yellow markings: triangular spot in front of ante-alar sinus, separated by a narrow black space from a broad antehumeral band; antehumeral bands slightly convergent dorsally. Sides light yellow with two rather narrow black lines; slightly in front of metastigma and on second lateral suture. Metasterna chiefly black.

Legs black, first femora light yellow internally. Abdomen cylindrical, rather robust. Black with light yellow markings: sides on segments 1-6, this colour widened dorsally at base of 4-6; 7-9 small lateral spots; 1-3 sinuate yellow line on mid-dorsal carina; 4-9 narrow line on mid-dorsal carina, slightly widened in distal third of 4-6. Appendages and supra-anal tubercle light yellow. Ventral surface black with marginal yellow spots. (Vulvar scale not visible.)

Wings hyaline, pterostigma ochreous, sub-costal cross-veins light yellowish.  $Anq\ 9\frac{1}{2}$ - $9\frac{1}{2}$ ;  $t\ 0.0$ ;  $ti\ 2.3$ ;  $Cuq\ \frac{1.1}{2.1}$ ; in front wing two rows of discoidal cells to level of bridge or slightly beyond (in left wing but one cell in third series); in left hind wing two cells running through between  $M_4$  and  $Cu_1$  (right side damaged). Arculus in front wing at  $Anq_2$ , in hind wing slightly beyond.

*Abd.* 18, *hdw.* 24, *pt.* 2.5 mm.

In a typical West African series adult males have considerably more black on thoracic sides and the abdomen pruinose blue; females are similar on thorax to male, with yellow markings of abdomen smaller; a very mature specimen also with abdomen pruinose blue.

#### ACISOMA (Rambur, 1842).

The peculiar structure of the basal abdominal segments induced Rambur to establish this genus, which is therefore one of the earliest named genera in the subfamily *Libellulinae*. Its affinities are evidently with *Diplacodes*, of which it might be considered a specialised branch. One form is common throughout tropical Asia, continental

and insular, East to Celebes. But the genus is more fully developed in Africa.

Forms that have been considered as racially distinct from the Asiatic *A. panorpoides* exist in the vast region between Algeria, Delagoa Bay and Madagascar, and a second very distinct species (*trifidum*, Kby.) is known from tropical West Africa.

ACISOMA PANORPOIDES ASCALAPHOIDES (Rambur, 1842).

S. Afr. Mus.: 1 ♂, 1 ♀, Lorenzo Marques (25, 27 . ix . 1911); 2 ♂, Ovamboland Otymbora. Coll. Ris: 12 ♂, 8 ♀, *ibid.* (11 . ii, 10, 11, 17, 25 . iii . 1911).

♂. Labium and labrum whitish. Face and frons light blue, fronto-nasal suture and base of frons broadly black. Thorax light greenish blue with an intricate pattern of deep black: black lines on medial, humeral, lateral and latero-ventral sutures, antehumeral, mesepimeral and metepimeral lines, these lines of variable breadth, sometimes interrupted, mostly with an undulating longitudinal anastomosis. Legs robust, black, narrowly lined with bluish or yellowish externally. Abdomen light blue with black markings: mid-dorsal longitudinal band; lateral bands, trilobate ventral spots and transverse carinae on inflated basal segments; latero-ventral band on segments 5-7; segments 8-10 wholly black. Superior appendages whitish above, black beneath, inferior appendage black.

Wings hyaline, very slightly and gradually fumose at tips; a very small yellowish spot at base of hind wings. Pterostigma whitish yellow.

♀. Similar to male in outline, slightly more robust. Frons olivaceous, black only at base, instead of an anterior black line a ferruginous shade. Thorax greenish or olivaceous; the pattern of male only indicated by rather diffuse darker olivaceous or ferruginous shades, often interrupted and sometimes quite indistinct. Abdomen olivaceous; dark pattern similarly reduced, blackish only at the carinae and on terminal segments. Legs mostly olivaceous, with interrupted blackish lines. Wings as in male.

♂, *Abd.* 20, *hdw.* 21, *pt.* < 3 mm. to 22, 24, 3.5. ♀, 19, 21, 3 to 22, 25, 3.5.

The series of specimens here recorded illustrates an East African form, named *A. variegatum* by Kirby and Sjöstedt (specimens from Nyasaland and from Kilimandjaro respectively), the writer's form B of the subspecies. Its distinctive features are—comparatively large size, dilatation of fifth abdominal segment very slight.

## DIPLACODES (Kirby, 1899).

A genus embracing a small number of species, but several of them very widely distributed in tropical and sub-tropical Africa, Asia, and Australia, and common where they occur; a parallel to the American genus *Erythrodiplax*, although not equal to this one in importance for the respective faunal region.

Smaller species. Adult males with labium, face and frons whitish yellow, a broad basal black band of frons. Thorax pruinose blue, elliptical ante-humeral spots indicated by lighter colour of pruinosity. Abdomen black with segments 1-3 pruinose blue. Wings hyaline with very small brownish spot at base of second pair; only one or two cells at membranule. Females and immature males black and light yellow, much like the following species. ♂, *Abd.* 18, *hdw.* 20, *pt.* < 2 mm. ♀, 13.5, 16, < 2 to 15, 19, < 2 . . . . . *D. exilis*.

Larger species, but very variable in size. Adult males wholly black, ventral surface of thorax and abdomen very slightly whitish pruinose. Wings mostly with a diffuse greyish cloud at tips; basal spot of second pair brown to *Cuq* or slightly beyond and to end of membranule; pterostigma greyish ochreous to dark ferruginous. Immature males gradually passing from a black and yellow pattern similar to female to the mature colour. Females with lips, face and frons light yellow; black basal line on frons. Thorax light yellow with blackish markings; line near median suture; broader line on humeral suture and an oblique band between ventral third of humeral and dorsal end of ante-humeral line; line between humeral suture and metastigma dorsally incomplete; at metastigma ventrally incomplete on second lateral suture; on metepimeron dorsally incomplete (this pattern gradually developing from an almost unmarked condition). Abdomen light yellow with mid-dorsal black band on segments 1-10, latero-ventral black bands on segments 3-10; lateral bands mostly broader on posterior half of each segment and fused to dorsal band by a small terminal dilatation of the latter on segments 6-10. Wings hyaline, no terminal greyish cloud; basal spot in posterior pair similar in extent to male, but deep golden yellow; pterostigma light yellowish ochreous. ♂, *Abd.* 17, *hdw.* 19, *pt.* 2 mm. to 25, 29, 3.5. ♀, 17, 23, 2.5 to 20, 23, 3 . . . . . *D. Lefebvrei*.

## DIPLACODES EXILIS (Ris, 1911).

Coll. E. B. Williamson: 1 ♀, Salisbury, Mashonaland (ix. 1900, Marshall).

The present specimen is the only one known to the writer from continental Africa; the type series came from Madagascar. Although mature males are widely different from *D. Lefebvrei* in similar condition, looking much like a minute edition of the Asiatic *D. trivialis*, immature males and females are not easily defined. Owing to the great variability of pattern in *Lefebvrei* (by degrees of maturity

and also truly varietal), there remains scarcely more than the very small size for the definition of the female of *exilis*. In the present specimen the shape of abdominal black bands seems worthy of mention: mid-dorsal band comparatively broad, nearly equally broad throughout from segments 4 to 10, no terminal dilatations; lateral bands narrower, dilatations of posterior half only very slight on segments 5 to 7.

*Abd.* 13.5, *hdw.* 16, *pt.* < 2 mm. Ante-nodal cross-veins in front wing  $6\frac{1}{2} \cdot 6\frac{1}{2}$ ; terminal triangles free.

#### DIPLACODES LEFEBVREI (Rambur, 1842).

S. Afr. Mus.: 4 ♂, 5 ♀, Lorenzo Marques (24. 25. ix, 22. x, 3, 5, 13, 15. xii. 1911); 1 ♂, M'Fongosi, Zululand (x. 1911, W. E. Jones); 1 ♂, Inhambane (xii. 1912, K. H. Barnard); 1 ♀, Gwaai, S. Rhodesia (15. ii. 1912); Kaapmuiden, Transvaal (xi. 1918, Tucker); S.W. Protectorate, Otjituo (i. 1910, Lightfoot); Tsumeb (i. 1920, Tucker). Coll. K. J. Morton: 1 ♂, 2 ♀, Beira (19. x. 1908, Miss Fountaine). Coll. Ris.: 3 ♂, 3 ♀, Lorenzo Marques (24. ix, 26. xi, 13, 15. xii. 1911); 1 ♂, 3 ♀, Rikatlá, Delagoa Bay (ix. 1913; iii, 17. iv. 1914, H. Junod).

The specimens here recorded indicate the southern limits of this species, which is known from all parts of the African continent, including the Mediterranean region; it is also recorded from Asia Minor, Syria and Arabia, Madagascar and Mauritius, but not from the Seychelles, where the Asiatic *D. trivialis* has been found. Considerable variability in size, neural details (number of ante-nodal cross-veins, internal triangle free, two-celled, rarely even three-celled) and colour pattern does not appear dependent on geographical conditions, or colour varieties even when due to different stages of maturity than on true individual variation. A number of names given to such varieties by earlier and later authors was therefore abandoned by the writer, following in this the example of MacLachlan.

The development of colour in male from a black and yellow pattern similar to female to almost uniform black, according to maturity, as found in *D. Lefebvrei*, has parallel cases, of which *Sympetrum danae* from Europe, Northern Asia and boreal America is a long known one, and another is *Erythrodiplax nigricans*, a South American species about equally common in its habitat in the Argentine Republic.

#### CROCOTHEMIS (Brauer, 1866).

A genus of predominantly African distribution. One of the African species (*erythraea*) penetrates into Europe, even beyond the Mediter-



ranean zone, into Western and Central Asia, and is followed east and southward by a very closely allied form (*servilia*).

1. Venation close in apical portion of wings; two rows of cells between *Rs* and *Rspl*. *Cu*<sub>1</sub> in hind wing regularly separated from anal angle of *t*. Base of front wings unmarked, of hind wings with a small yellow spot at membranule . . . . . 2.  
Venation wider in apical portion of wings; but one row of cells between *Rs* and *Rspl*. *Cu*<sub>1</sub> in hind wing as a rule at anal angle of *t*, but not rarely a little separated in individual varieties. Base of front wings with a small, of hind wing with a large deep golden-yellow spot to base of *t* and anal margin . . . . . 3.
2. *t* in hind wings crossed, not rarely 2 *Cu*<sub>q</sub> in hind wings. Very minute black markings on thorax and abdomen. Male lips and face whitish yellow, frons ochreous or olivaceous. Thorax light reddish brown dorsally, turning to yellowish and gradually to whitish at the sides; dorsum with numerous elevated black points and a faint indication of dark ante-humeral lines. Abdomen similar in shape to *sanguinolenta*, but still a little narrower; ferruginous, with a narrow mid-dorsal blackish line and the lateral margins of segments 4-7 narrowly blackish, except at both ends. Wings hyaline, with a very minute light yellow spot at the membranule of second pair. Pterostigma ferruginous, distinctly widened in the middle. Female similar to male in shape, colour and markings. (Described from slightly immature specimens; mature males are probably more distinctly red, especially on abdomen.) ♂, *Abd.* 22, *hdw.* 27, *pt.* 4 mm. ♀, 21, 27, 3·5 . . . . . *C. divisa*.  
*t* in hind wings free, regularly 2 *Cu*<sub>q</sub> in hind wings. An extensive chequered pattern of black or dark brown on thorax and abdomen.

*C. saricolor*.

3. Abdomen comparatively narrow, 2·5 to 3 mm. Lateral carinae strongly toothed (for instance, 10-12 robust denticles at lateral carina of segment 5). Pterostigma 3 mm. and less, scarlet red in adult males. External branch of hamule less abruptly pointed, vulvar scale larger than in following species. Male: Face and frons brilliant scarlet. Thorax scarlet with a shade of golden yellow. Abdomen brilliant scarlet; narrow black lines on mid-dorsal carina of segments 3-9, on anterior half of each segment 4-7, less on 3, entire length on 8-9; small black points on middle of lateral margin of segments 3-7. Female: Full ochreous, brown instead of scarlet colour in male; narrow and slightly diffuse whitish stripe in front of humeral suture; blackish markings of abdomen usually more distinct than in male. ♂, *Abd.* 20, *hdw.* 26, *pt.* < 3 mm. ♀, 20, 27, 3 . . . . . *C. sanguinolenta*.  
Abdomen broad, 3·5 to 4·5 mm. Denticles of lateral carinae much finer (for instance, 20-22 very minute denticles on lateral carina of segment 5). Pterostigma 3·5 to 4 mm., light yellowish between black veins in adult males. Male deep blood red with no black markings except a narrow line on mid-dorsal carina of segments 8-9. Female ochreous yellow to yellowish olivaceous, immature specimens and sometimes also adult specimens with indication of yellowish ante-humeral bands. Basal spot

of wings deep golden yellow in male; mostly lighter, less brilliant in colour and veined with light yellow in female. ♂ ♀, *Abd.* 26, *hdw.* 29, *pt.* 3.5 mm. to 28, 32, < 4 . . . . . *C. erythraea*.

*CROCOTHEMIS DIVISA* (Karsch, 1898).

Coll. E. B. Williamson: 3 ♂, 1 ♀, Salisbury, Mashonaland (ii. 1900, iv. 1905, Marshall).

A widely distributed but evidently not common species, known from a limited number of specimens. From the extreme points where it was found, its existence in Africa between Zungeru in Nigeria, Gondokoro in Uganda, Salisbury, Diego Suarez in Madagascar can be admitted.

*CROCOTHEMIS SAXICOLOR*, n. sp.

Coll. E. B. Williamson: 1 ♂, 5 ♀, Salisbury, Mashonaland (iv. 1900, 1905, Marshall).

♂ (immature). Light ochreous yellow, markings similar to adult females. Genitalia of segment 2; hamule slightly different from *divisa*; external branch broader, not produced in a point; internal branch rather shorter, shorter than external branch. Superior appendages almost straight, inferior angle but faintly indicated, near apex, a few minute black denticles preceding.

♀ (adult). Lips whitish yellow. Face and frons anteriorly greyish olivaceous, triangular flattened spaces very distinct; frons above and vertex similar in colour, but darker. Thorax light greyish ochreous with an olivaceous shade, marked with black; numerous elevated points, densely arranged on dorsum, less numerous on sides and not reaching behind metastigma; maculate, not sharply-defined stripes at median suture and half way between median and humeral suture; spot in front of humeral suture at mid-height, all fused by somewhat diffuse anastomoses; laterally incomplete narrow brownish stripes between humeral suture and metastigma on ventral half, at metastigma in dorsal third; narrow black line on dorsal half of second lateral suture, and longitudinal line on dorsal margin of metepimeron. Ventral surface whitish. Legs very light ochreous, spines black. Abdomen comparatively slender, almost cylindrical, very little narrowed backward. Dull greyish ochreous with an olivaceous shade, marked with blackish; dorsum of segment 1 except a small median yellowish spot; 2-3 lateral band, a little distant from ventral margin, and narrow lines at the carinae; 4-7 mid-dorsal line, a little widened in middle and near posterior end of each segment; lateral band,

shortly interrupted at joints and touching lateral carinae in middle of each segment; 8-9 elliptical spot on mid-dorsal carina and broad lateral bands; 10 small median and lateral spots. Ventral surface light yellow, somewhat greenish at base, lateral carinae very narrowly lined with black. Appendages light greyish. Vulvar scale a little shorter than ninth ventral plate, narrowly elliptical, not much raised (similar to *divisa*); end of ninth ventral plate somewhat produced ventrally.

Wings hyaline; pterostigma light greyish ochreous, broad, somewhat widened in middle. Venation blackish, cross-veins in *sc*, between *R* and *M* outward to bridge, and in *cu* whitish. Membranule dark grey. *Ang*  $9\frac{1}{2}$ .

♂, *Abd.* 23, *hdw.* 27, *pt.* 3 mm. ♀, 24, 29 > 3.

One of the females bears the collector's note: "Settles only on granite boulders at a distance from water; very difficult to detect, also very local." This observation is of special interest with regard to the most peculiar chequered pattern of this species, a pattern which might be justly claimed as granite colour. This and the preceding species are somehow intermediate between *Crocothemis* and *Bradino-pyga* in neural characters and in general facies, though probably the *Crocothemis* characters may be claimed as prevalent.

#### CROCOTHEMIS SANGUINOLENTA (Burmeister, 1839).

S. Afr. Mus.: 5 ♂, 1 ♀, Barberton, Transvaal; 2 ♂, 3 ♀, M'Fongosi, Zululand (ii, iii, xi. 1911, W. E. Jones); 1 ♀, Livingstone, Zambesi; 1 ♂, Victoria Falls (vii. 1911); 1 ♂, 1 ♀, Matopo, Rhodesia (16. ii, 28. v. 1911); Kaapmuiden, Transvaal (xi. 1918, Tucker); St. Lucia Bay, Zululand (x. 1919, Bell-Marley); Otavi, S.W. Africa (i. 1920, Lightfoot). Brit. Mus.: 1 ♀, Cap. Bon. Spei (Sowerby, very old specimen); 1 ♂, Port Natal; 1 ♂, 2 ♀, Chirinda Forest, Gazaland, 3600-4000 ft. (27. ix, 3, 17. x. 1905, Marshall); 3 ♂, Salisbury (1904, *id.*). Coll. K. J. Morton: 1 ♂, Macequece (23. ix. 1908, Miss Fountaine); 1 ♂, 1 ♀, Wolluterkop, Transvaal (i, xii. 1908, *ead.*). Coll. E. B. Williamson: 2 ♀, Salisbury (ii. 1900, v. 1904, Marshall); 2 ♂, Hilton Road, Natal, 3500 ft. (17. xii. 1909, G. F. Leigh); 1 ♀, Natal (17. iii. 1909, *id.*).

Although found north to Nigeria, Sierra Leone and Abyssinia, this species is more decidedly South African than *C. erythraea*. No true intermediates between the two species are known to the writer; specimens of *sanguinolenta* lacking the blackish markings of abdomen are found in intertropical Africa and Abyssinia, but their forms and

structural details clearly indicate their identity. No true affinity exists with *Trithemis*, in which genus the species had been located by some of the earlier authors.

#### CROCOTHEMIS ERYTHRAEA (Brullé, 1832).

S. Afr. Mus.: 5 ♂, Uitenhage, Stellenbosch, Matjesfontein, Potchefstroom, Durban; 1 ♂, Waterkloof (20. xii. 1906); 1 ♂, Rietfontein (9. x. 1904); 1 ♂, Warmberg, Zoutpansberg District Transvaal (6. xii. 1903); 1 ♂, 2 ♀, Dunbrody, Blue Cliff (ii, iii. 1912); 1 ♀, M'Fongosi, Zululand (iii. 1911, W. E. Jones); 4 ♂, Lorenzo Marques (7. vi, 13. xi, 4. xii. 1911). Brit. Mus.: 2 ♂, Salisbury, Mashonaland (1904, Marshall); 2 ♂, Deelfontein (1902, Col. Sloggett); 1 ♂, Johannesburg 2 ♂, 1 ♀, Natal; 2 ♂, Cape. Mus. Berlin: 5 ♂, 6 ♀, Rooibank (L. Schultze). Coll. K. J. Morton: 1 ♀, Durban (27. i. 1908, Miss Fountaine). Coll. E. B. Williamson: 4 ♂, 5 ♀, Salisbury (v. 1899, i, ii, x. 1900; iii. 1905, Marshall); 1 ♂, 1 ♀, Princetown, Natal (8. xii. 1908, 17. iii. 1909; G. F. Leigh). Coll. Ris: 1 ♀, Waterval Boven, Transvaal (15. ii. 1914, Junod).

One of the most conspicuous, common and characteristic dragonflies of the Mediterranean zone in Europe and Africa, this species is evidently rather common almost everywhere in Africa, except in the zones of heavy tropical rains and corresponding forest vegetation. It is also found in Madagascar. If a series of *C. erythraea* from Southern France is compared with material from the faunal region here discussed no appreciable differences can be found.

#### BRADINOPYGA (Kirby, 1893).

Very closely allied to *Crocothemis*; two African and one East Indian species.

#### BRADINOPYGA CORNUTA (Ris, 1911).

S. Afr. Mus.: 1 ♂, Salisbury, Mashonaland (vi. 1913); 2 ♂, 2 ♀, Kaapmuiden, Transvaal (30. x. 1918, R. E. Tucker). Coll. E. B. Williamson: 1 ♀, Salisbury (iv. 1900, Marshall); 1 ♀, Princetown, Natal (19. ii. 1909, G. F. Leigh).

♂. Lips ochreous. Face and frons dull olivaceous, frons darker above. Anterior ridge of frons rather indistinct, its lateral ends projecting in the form of small sharp spines. Vertex deeply emarginate, also projecting in two acute points. Thorax very robust, mid-dorsal carina strongly projecting; anterior margin of ante-alar sinus with a

row of sharp denticles. Dark chocolate brown with a chequered pattern of whitish spots; narrow line at median suture; sinuate, dorsally interrupted ante-humeral stripe; double spot between this stripe and humeral suture; three rounded spots, an interrupted line and some minute points between on mesipimeron; sinuate ventral band and triangular dorsal spot on metepisternum; four spots on metepimeron. Ventral surface dull brown, darker at sutures. Legs olivaceous, end of second and third femora conspicuously whitish, internal side of tibiae and spines black. Abdomen moderately widened at base, from third segment almost cylindrical; segments 7-9 very slightly widened in dorso-ventral dimension with a pattern of olivaceous and black, the latter colour predominant. The pattern consists in a rather narrow mid-dorsal and broad lateral black bands, both confluent in the middle and towards the end of each segment, the lateral bands being a little distant from the lateral carinae; olivaceous colour broadest on segment 7, where it forms a transverse band over almost the anterior two-thirds of the segment. Appendages olivaceous, superior ones almost straight; no distinct inferior angle, a row of minute denticles on a blackish ridge instead; inferior appendage but little shorter. Genitalia of second segment small; hamule with external branch broadly rounded, internal branch but little shorter, a strongly curved hook; lobe higher than hamule, rounded, almost circular.

Wings hyaline; a sharply defined narrow brown edge at tips; pterostigma dark brown in costal half, gradually passing to ferruginous in anal half; membranule greyish.  $Anq\ 9\frac{1}{2} \cdot 9\frac{1}{2}$ .  $t\ \frac{2}{1} \cdot \frac{2}{1}$ ;  $ti\ 4 \cdot 4$ ; 4 rows of discoidal cells in front wing from level of bridge, once 4 cells at triangle on right side; 2 rows  $Rs-Rspl$ .

*Abd.* 29, *hdw.* 37, *pt.* 3.5 mm.

♀. Very similar to male. Abdomen shorter and more robust. Vulvar scale narrowly elliptical, raised, a little shorter than ninth segment dorsally; ninth ventral plate projecting in a broad, rounded tongue almost to end of tenth segment. Wings brown at tips almost to distal end of pterostigma.  $Anq\ 10\frac{1}{2} \cdot 10\frac{1}{2}$ ;  $t\ \frac{1}{1} \cdot \frac{1}{1}$ ;  $ti\ 4 \cdot 4$  (Salisbury);

$Anq\ 10\frac{1}{2} \cdot 10\frac{1}{2}$ ;  $t\ \frac{1}{1} \cdot \frac{2}{1}$ ;  $ti\ 4 \cdot 4$  (Princetown).

*Abd.* 25, *hdw.* 36, *pt.* 3.5 mm.

The type male (from Mozambique) differs from the present specimen by rather large golden-brown spots at base of both wings; the incomplete female type (from East Africa) is similar to the present females. On the Salisbury female the collectors note: "Habits same

as *C. Crocothemis saxicolor*." Together with the habits the peculiar "granitic" pattern is also common to these remarkable two species.

### BRACHYTHEMIS (Brauer, 1868).

Two African and two Asiatic species, one of each group of very wide range and common.

#### BRACHYTHEMIS LEUCOSTICTA (Burmeister, 1839).

S. Afr. Mus.: 1 ♂, Waterval, Transvaal (13. v. 1900); 1 ♂, Kafue River, Rhodesia (v. 1912); 1 ♂, Matopo Dam, Bulawayo (16. ii. 1911); Potgietersrust, Transvaal (x. 1914, Dr. Melle); Otjituo, S.W. Protectorate (i. 1919, Lightfoot); Otiembora (xi. 1887, Eriksson) and Mafa (ii. 1921, Barnard), S.W. Protectorate. Coll. Sélys: 2 ♂, 1 ♀, Delagoa Bay.

♂ (adult). Labium dark brown; labrum, face and frons brownish black. Thorax and abdomen wholly black, very slightly whitish pruinose. Legs brownish black. Wings hyaline with a broad blackish-brown transverse band, occupying in most specimens the whole space between nodus and proximal end of pterostigma. Pterostigma whitish yellow in proximal two-thirds, dark grey in distal third. Immature males similar to female, gradually passing to the mature black colour; black band of wings also gradually appearing, very rarely absent in fully mature males.

♀. Lips whitish yellow; ante and postclypeus very light olivaceous, frons and vertex whitish yellow, narrow black line at base of frons. Thorax and abdomen bright ochreous, with an olivaceous shade, marked with black; lines at median and humeral suture, bifurcate ante-humeral band; lines between humeral suture and metastigma, dorsally from metastigma, at second lateral suture, and on metepimeron. Abdomen with narrow mid-dorsal line, broad lateral band nearer to lateral than to median carina, partially interrupted at the joints, narrow dots on lateral carina. Legs light yellowish, with narrow black lines. Wings hyaline with a small light yellow basal spot of second pair, to *Cuq* and end of membranule. Post-nodal band absent altogether, even in fully mature specimens, or present in various degrees of extent and depth of colour, but never fully as broad and as deeply coloured as in regular males. Pterostigma as in male.

♂, *Abd.* 20, *hdw.* 24, *pt.* 2.5 mm. to 21, 25, 3. ♀, 18, 22, 2.5 to 20, 26, 3.

The specimens here recorded indicate evidently the extreme southern

limits of this species, which is extremely common in tropical Africa, and known also from Algeria, where it is said to be gregarious in habits.

SYMPETRUM (Newman, 1833).

A genus of many species and wide distribution in the Northern temperate zone of the Old World and of America. A single species penetrates into South Africa.

SYMPETRUM FONSCOLOMBEI (Sélys, 1840).

S. Afr. Mus.: 1 ♂, Matopo Dam, Bulawayo (16.ii.1911); 1 ♂, 2 ♀, Rietfontein, Transvaal (6.ii.13.x.1904); 1 ♂, Warmberg, Tv. (17.iv.1904); 1 ♂, 1 ♀, Waterval, Tv. (10.x.1899); 4 ♂, 8 ♀, Cape Town (ix.1913, L. Peringuey); 1 ♀, Stellenbosch (ix.1913, R. M. Lightfoot). Brit. Mus.: 1 ♀, N.E. Rhodesia, Luwumbu Valley, Upper Luangwa, 2500-3000 ft. (19.26.vii.1910, S. A. Neave); 1 ♀, Salisbury (Marshall); 2 ♂, Boksburg, Johannesburg (C. H. Pead); 1 ♂, Transvaal (A. Ross); 4 ♂, 1 ♀, Deelfontein (1903, Col. Sloggett); 2 ♂, Orange River Colony (1902, G. E. B. Hamilton); 1 ♂, 1 ♀, Simons Town; 1 ♂, 3 ♀, Cape (very old specimen). Coll. E. B. Williamson: 2 ♀, Salisbury, 5000 ft. (i, iii. 1900, Marshall). Mus. Berlin: 4 ♂, 2 ♀, Kalahari (L. Schultze).

♂. Labium yellow; labrum, face and frons brilliant scarlet, narrowly lined with bluish white at the sides; broad, deep black basal line on frons. Thorax rich reddish golden brown dorsally; sides with two broad whitish bands on mesepimeron and metepimeron, those bands turning gradually to greenish or olivaceous shades in dorsal half, or altogether fading in very mature specimens; inter-mediate space at metastigma dull red. Abdomen comparatively robust, scarcely contracted at third segment, brilliant scarlet; broad black mid-dorsal band on segments 8-9. Legs black; femora and tibiae with narrow external yellow lines. Wings with neuration light red, very gradually darker from nodal region outward; golden yellow basal spot in hind wings of variable extent, but at least to *Cuq* and apex of membranule. Pterostigma very light ochreous yellow between black veins. Membranule white.

♀. Ante- and postclypeus greenish white, lips, face and frons very light yellowish. Thorax light yellowish brown instead of the reddish colour of males; lateral greenish-white bands not considerably darkened dorsally. Abdomen light ochreous. Neuration of wings very light ochreous instead of red; pterostigma as in male.

♂, *Adb.* 28, *hdw.* 29, *pt.* 3 mm. ♀, 28, 31, 3.

Very common in Mediterranean Europe and Africa, eastward to Turkestan and the mountains of South India. Not a regular inhabitant of the extra-Mediterranean regions in Europe, but appearing there (in Switzerland, Germany to the Baltic Sea, Great Britain to the Firth of Forth) at irregular intervals and sometimes in vast numbers. The unusually early appearance in some cases (middle of May, 1908, in Switzerland) clearly indicates that these swarms are emigrants from the South; all local examples of *Sympetrum* do not appear in this country before July and most of them not before August; in years when there is no immigration *Fonscolombei* is not altogether absent, but is very rare and local. Very probably corresponding habits will be observed in South Africa; the series taken in Cape Town at the early date of September, 1913, may have been immigrants like those found in May at the writer's Swiss home. Observations made by the writer and Mr. Morton in Southern France seem to indicate that the species is not at all particular as to the quality of water; we found it abundantly at a very badly polluted canal near the city of Narbonne. This and the migrating habits may have favoured the dispersal of this species so far beyond the limits of its palaearctic congeners.

#### PHILONOMON (Forster, 1906).

A single African species, evidently allied to *Sympetrum* and resembling this genus in facies.

#### PHILONOMON LUMINANS (Karsch, 1893).

S. Afr. Mus.: 1 ♂, Lorenzo Marques (15 . xii . 1911). Coll. Ris: 2 ♀, *ib.* (12, 15 . xii . 1911).

♂. Labium whitish with a narrow median black band; labrum and anteclypeus ochreous; postclypeus and frons brilliant scarlet; narrowly and diffusely yellow at the sides; narrow basal black line on frons. Thoracic dorsum light golden brown, sides greenish yellow; black dot in dorsal end of humeral suture; black line at metastigma half way to dorsal margin; very narrow black line on second lateral suture; latero-ventral sutures broadly black; ventral surface yellowish with two broad transverse black bands. Legs black. Abdomen moderately inflated at base, gradually narrowed in third and fourth segment, then almost cylindrical; greenish yellow and black; black mid-dorsal line, narrow on basal segments, wider from segment 4



backward; oblong black spots at posterior half of segments 4 to 7, fused to dorsal black at end of each segment, narrowly 4-5, broadly 6-7; eighth segment with sides wholly black, only cuneiform basal lateral spots remaining yellow; 9-10 wholly black; dorsum of segments 2-4 bright orange to scarlet red. Wings slightly stained with greyish yellow: broad, deep golden-yellow basal spot on second pair, to basal side of *t* and anal angle; smaller and not so deeply coloured spot on first pair. Pterostigma whitish at both ends, diffusely greyish ferruginous in middle; membranule greyish ferruginous.

♀. Very similar to male, but no red colour on face, frons and dorsum of basal segments of abdomen. Colour of basal spot in hind wings lighter yellow.

♂, *Abd.* 27, *hdw.* 29, *pt.* < 3 mm. ♀, 24, 30 < 3.

Widely distributed in tropical Africa, East and West, also recorded from Nossi Be and recently by Mr. Campion from Assumption Island, of the Aldabra Group in the Indian Ocean.

#### HELOTHEMIS (Karsch, 1890).

The single species representing this genus is a very close ally to *Trithemis*. The absence of the incomplete last ante-nodal cross-vein seems to be a regular character, and since great importance (evidently exaggerated in some cases) is given to the presence or absence of this vein, the genus may stand, though with doubtful rights.

#### HELOTHEMIS DORSALIS (Rambur, 1842).

S. Afr. Mus.: 1 ♂, 1 ♀ (old specimens, no locality); 1 ♀, Boksburg, Transvaal; 1 ♂, Salisbury (24. xii. 1911). Brit. Mus.: 1 ♂, Cape; 1 ♂, Transvaal; 2 ♂, 1 ♀, Johannesburg (1903, H. Crawford-Cruger); 1 ♂, Boksburg, Johannesburg (C. H. Peard); 1 ♀, Willow Grange, Mooi River, Natal (i, ii. 1913, R. C. Wroughton). Mus. Stockholm: 2 ♂, Caffraria (J. Wahlberg). Coll. Selys: 1 ♂, 3 ♀, Cap de Bonne Esq. Coll. E. B. Williamson: 1 ♂, Salisbury (iii. 1900, Marshall). Coll. Ris.: 3 ♂, Botchabelo, 1200 m., Transvaal (17, 18, 19. ii. 1914, H. Junod).

♂. Labium black, sides yellowish; labrum, anteclypeus and frons anteriorly black; postclypeus and a narrow line at anterior suture of frons dark olivaceous. Frons above and vertex brilliant metallic violet. Thorax and abdomen wholly blackish, turning to violet-blue owing to a rather thin pruinosity. Legs black. Wings hyaline; small, deep golden-yellow spot at base of second pair, about half way to *Cu*<sub>1</sub> and two cells at membranule. Pterostigma blackish, in some

specimens very narrowly whitish at proximal end. Immature males similar to female, but black bands of abdomen broader, very gradually passing to mature colour; vestiges of thoracic pattern often visible in partly pruinose specimens.

♀. Labium yellowish, median lobe, and sometimes a narrow median line on side lobes black. Labium, face and frons yellow; broad basal black band on frons, extending anteriorly into furrow. Thorax and abdomen light greenish-yellow with black markings; cuneiform band narrower dorsally, on median suture; lines very close to humeral suture, on humeral suture, half way to metastigma, on metastigma, on second lateral suture, on metepimeron; these lines, except the sutural ones, mostly dorsally incomplete. Abdomen with broad, slightly sinuate mid-dorsal band, narrow lines on lateral and transverse carinae, broader on segments 7-9 and confluent with dorsal black. Wings slightly stained with greyish yellow throughout; deeper yellow but very diffuse spots at nodus and variable yellow basal spot on second pair to *Anq*<sub>1</sub>, *Cuq* and end of membranule in specimen from Johannesburg. Legs black, with light yellow lines on external side of femora.

♂, *Abd.* 27, *hdw.* 29, *pt.* 3 mm. ♀, 25, 29, 3.5.

This is one of the characteristic *Libellulinae* of the South African fauna, though extending northward to British East Africa. It resembles strangely *Trithemis Distanti*, not only in colour but even in genital structure of male, though *H. dorsalis* has the wings comparatively more elongate than *T. Distanti* and their venation more close. Males may further be distinguished by their hamule being higher (especially the basal part) than in *Distanti*; females and immature males of *Distanti* show the black lines of thoracic sides with a distinct tendency to longitudinal fusion, common to almost all species of *Trithemis*; in *H. dorsalis* these lines are very sharply defined and there is no indication of longitudinal fusion. Kirby had described (1905) the genus as new under the name *Misthotus*, and the male from slightly different individuals as *M. ambiguus* and *M. Marshalli*. The descriptions of *Helothemis* (Karsch) and of the species *dorsalis* (Rambur) were made from the female. The highly dimorphic sexes were united under the older name by the writer.

#### TRITHEMIS (Brauer, 1868).

A genus of wide distribution in tropical Asia, tropical and sub-tropical Africa, the greater number of species African. Together with *Orthetrum* it is the dominant African genus of *Libellulinae* in number of species and of individuals.

## Males.

1. Colour predominantly red . . . . . 2.  
     Colour predominantly black, markings light yellowish . . . . . 5.
2. Abdomen little widened at base, not sensibly contracted in third segment, triquetral and very gradually narrowed to apex . . . . . 3.  
     Abdomen little widened at base, contracted at third segment, very slender and slightly fusiform hindward. Pterostigma small, very dark ferruginous to almost black; neurulation close,  $11\frac{1}{2}$ - $12\frac{1}{2}$  *Anq*; veins red distally to pterostigma. Variable deep golden-yellow spot at base of both wings; smaller spots to *Anq*<sub>1</sub> and *Cuq* in front wing to *Anq*<sub>1</sub>, *Cuq* or very little beyond and apex of membranule, or little more in hind wing; larger spots to *Anq*<sub>2</sub> and arculus in front wing to *Anq*<sub>2-3</sub>, proximal or even distal end of *t* and anal angle in hind wing. Face dull ferruginous, frons above coppery red. Thorax reddish golden brown; black stripes on mesepimeron, at metastigma and at second lateral suture, dorsally incomplete and partially confluent to form a longitudinal stripe. Abdomen blood red; blackish lateral stripe at mid-height of segments 1-3, sides of segments 4-8 deep black, 9-10 wholly black. Legs black. *Abd.* 23, *hdw.* 25, *pt.* < 2 mm. to 26, 30, 2·5 . . . . . *T. arteriosa*.
3. Furrow of frons moderately deep; vertex broadly emarginate. Triangles of hind wings free, regularly but one *Cuq* in hind wings; pterostigma medium-sized . . . . . 4.  
     Furrow of frons deep; vertex triangularly excised, two-pointed. Triangles of hind wings very often crossed, not rarely 2 *Cuq* in hind wings. Pterostigma very small; black, narrowly red at both ends on dorsal side, deep ferruginous on ventral side of wing. Base of both wings deep and brilliant golden yellow to about two cells beyond *t* in front wing, 3-4 cells beyond *t* in hind wing, part of *c* and *m* lighter in colour to almost hyaline. Neurulation red to a little beyond level of nodus. Face olivaceous; frons scarlet red, narrowly yellowish at base and at sides. Thorax reddish golden brown dorsally, turning to olivaceous at the sides, with vestiges of black lines. Abdomen brilliant scarlet red, narrow black mid-dorsal line on segments 8-9. Legs brown, tibiae externally light ferruginous or red. *Abd.* 20, *hdw.* 23, *pt.* 1·5 mm. to 22, 26, 1·5.  
     . . . . . *T. Kirbyi ardens*.
4. Pterostigma blackish with a narrow ochreous line at anal margin. Venation yellowish red to nodus, blackish more distally.  $10\frac{1}{2}$  to  $11\frac{1}{2}$  *Anq*. Base of front wings light golden yellow to *Anq*<sub>1</sub> and *Cuq*, of hind wings deeper golden yellow to *Anq*<sub>2</sub>, proximal side of *t* and anal angle. Face olivaceous; frons and vertex dull orange with no metallic colour, a narrow blackish line at base of frons. Thorax reddish golden brown, sides with vestiges of blackish lines. Abdomen dull blood red; lateral carinae very narrowly lined with black to segment 7, this black line broader on segment 8, and especially on 9 and 10; black mid-dorsal line on segments 8-9. Legs black. *Abd.* 24, *hdw.* 28, *pt.* 2·5 mm. . . . . *T. pluvialis*.  
     Pterostigma ochreous to very light ferruginous between black veins. Venation bright red to pterostigma.  $9\frac{1}{2}$  to  $10\frac{1}{2}$  *Anq*. Variable golden-yellow brown spot at base of wings; in average specimens half way to

*Anq*<sub>1</sub> and *Cuq* in front wing to *Anq*<sub>2</sub>, proximal side of *t* and anal angle in hind wing. Face and frons anteriorly reddish ochreous. Frons above and vertex brilliant metallic reddish violet. Thorax reddish brown, lighter at sides, with a pattern of confluent brown or blackish stripes as described for *arteriosa*. Abdomen dull blood red, sides of segments 1-3 yellowish, with an indistinct longitudinal blackish stripe; lateral carinae very narrowly black; broad mid-dorsal black band on segments 8-9. Legs black, first and second femora brown. Mature specimens faintly violaceous by very slight bluish pruinosity. *Abd.* 22, *hdw.* 26, *pt.* 2.5 mm. to 24, 30, 2.5 . . . . . *T. annulata*.

5. Abdomen little widened at base, contracted at third segment, very slender and slightly fusiform hindward; yellow markings on abdomen persistent in mature specimens . . . . . 6.
  - Abdomen little widened at base, not sensibly contracted at third segment, triquetral and very gradually narrowed to apex. Wings hyaline, venation black; base of hind wings hyaline, or with a very small yellow spot, not beyond *Anq*<sub>1</sub> and *Cuq* and at most one cell at membranule. Pterostigma broad, black, in most specimens with a narrow light yellowish line at anal margin. 10½ to 13½ *Anq*. Labium yellow with broad median black band. Labrum and postclypeus black; anteclypeus and anterior margin of frons olivaceous; frons above and vertex brilliant metallic violet blue. Thorax and abdomen very dark brown to black, made faintly violaceous by thin bluish pruinosity. Legs black. *Abd.* 24, *hdw.* 29, *pt.* 3 mm. to 26, 32, 3 . . . . . *T. Distanti*.
  6. Frons above brilliant metallic blue, pure, or with a greenish shade. Labium yellow with broad median black band. Labrum black with two yellow spots. Face and frons anteriorly light yellow. Thorax in mature specimens very densely light blue pruinose; in immature specimens with a pattern of black and light yellow similar to female. Abdomen black with light yellow markings; dorsal and lateral spots on segments 1 to 3; narrow lateral cuneiform spots on segments 4 to 7, gradually smaller hindward. Legs black. Wings hyaline, venation black; no basal yellow spot on posterior pair; but on hind wings (in all mature specimens) a large light yellow cloud between basal side of *t* and nodus in longitudinal, over the whole breadth of wing in transverse dimension. Pterostigma dark ferruginous to black, in most specimens with a narrow light yellowish line at posterior margin. 9½ to 10½ *Anq*. *Abd.* 25, *hdw.* 29, *pt.* 3 mm. . . . . *T. stictica*.
- Frons above brilliant metallic pure violet. Labium whitish with broad median black band. Labrum and postclypeus blackish; anteclypeus and anterior margin of frons olivaceous. Thoracic dorsum blackish, made dull violaceous by pruinosity; sides olivaceous, with three broad black bands: on mesepimeron, across metastigma and behind second lateral suture; these bands dorsally incomplete and longitudinally confluent near dorsal end. Abdomen black with light ochreous markings; broad lateral and very small dorsal spots on segments 1 to 3; very narrow lateral lines on segments 4 to 7, incomplete and sometimes interrupted. Wings hyaline or very faintly greyish yellow; venation in

costal and proximal half brown in longitudinal, ochreous to whitish in cross-veins; base of second pair with a golden-yellow to light golden-brown spot; vestiges in *c*, *sc* and *m*, almost to *Cuq* in *cu*, to apex of membranule. Pterostigma light ochreous in dorsal, whitish in ventral side of wings, between thin black veins, smaller than in two preceding species.  $8\frac{1}{2}$  to  $9\frac{1}{2}$  *Anq.* *Abd.* 30, *hdw.* 30, *pt.* 2.5 mm. . . . . *T. aureola*.

### Females.

1. Frontal furrow moderately deep, vertex obtuse or very shallowly emarginate.

Legs blackish, tibia concolorous . . . . . 2.

Frontal furrow very deep, vertex two-pointed. Wings hyaline; golden-yellow basal spot in hind wings to *Anq* 1 and *Cuq*; small round yellow cloud between *A*<sub>3</sub> and anal angle; pterostigma very small, blackish and narrowly ochreous at both ends in dorsal, blackish with anal margin ochreous in ventral surface of wing. Venation ferruginous to nodal region, gradually darker more distally.  $9\frac{1}{2}$ - $10\frac{1}{2}$  *Anq.* Lips, face and frons whitish yellow, frons diffusely darker at base. Thoracic dorsum olivaceous, an indistinct cuneiform stripe at median suture and broad band at humeral suture ferruginous. Sides olivaceous; incomplete dark lines at humeral suture, on mesepimeron, at metastigma and on second lateral suture; these lines rather diffuse, the stigmatic one alone being distinct and blackish. Abdomen comparatively robust, very gradually narrowed to apex; dull ochreous brown; very narrow black lines on carinae; black mid-dorsal band on segments 8-9; in some specimens an almost complete narrow blackish line between lateral and mid-dorsal carinae on segments 3-9. Third femora black with narrow external ochreous line; second and first femora ochreous, black internally. *Abd.* 20, *hdw.* 23, *pt.* < 2 mm. to 23, 28, 2 . . . . . *T. Kirbyi ardens*.

2. Colour of abdomen predominantly light, ochreous to reddish brown . . . . . 3.

Colour of abdomen predominantly black, light yellow lateral stripes . . . . . 6.

3. A distinct mid-dorsal black line on abdominal segments 2-10, or, if there is no such line, lateral black margins also absent . . . . . 4.

Mid-dorsal black line only on segments 2-3, sometimes 4, absent on segments 5-7; sides of segments 4-7 broadly black, this colour ascending almost to mid-dorsal line at terminal joint of each segment; 8 black with small ochreous latero-basal spots; 9-10 wholly black. Abdomen comparatively slender, though more robust than in corresponding male. Face, frons and vertex ochreous; narrow black basal line on frons. Thorax light golden brown dorsally; sides light greenish yellow, with the ordinary black lines of the genus rather narrow and not often confluent. Wings hyaline; basal spot golden yellow, predominantly small, only vestiges in front wing and not exceeding *Anq* 1, half way between *Cuq* and *t* and apex of membranule in hind wing; not rarely a light yellow cloud in region of nodus. Pterostigma conspicuously larger than in corresponding male, very dark ferruginous to blackish, often lighter at anal margin. Venation dark ferruginous to nodal region.  $11\frac{1}{2}$ - $12\frac{1}{2}$  *Anq.* *Abd.* 24, *hdw.* 28, *pt.* < 3 mm. . . . . *T. arteriosa*.

4. Pterostigma broad, bicolorous, black or very dark brown with anal margin light ochreous . . . . . 5.

Pterostigma not distinctly widened, unicolorous, light ochreous to light ferruginous between dark veins. Face and frons whitish yellow; variable dark line at base of frons, sharply defined and black, or only faintly indicated. Thorax light golden or greyish brown dorsally, in very mature specimens sometimes slightly pruinose; more yellowish at the sides, with the usual dark bands, more or less confluent longitudinally; this pattern distinct and blackish in immature specimens, gradually fading to greyish shades and often indistinct in very mature and pruinose ones. Legs blackish brown, first and partially second femora ochreous brown. Abdomen comparatively robust, almost cylindrical; light ochreous brown; sides of segments 1-3 yellowish with blackish lateral band; narrow black lines at mid-dorsal, lateral and transverse carinae; broader black mid-dorsal band on segments 8-9. Wings, venation light reddish yellow to the same extent as the red colour in male (dark to almost blackish in immature specimens); yellow basal spot similar to corresponding male, but generally paler in colour.  $9\frac{1}{2}$  to  $10\frac{1}{2}$  *Ang.* *Abd.* 22, *hdw.* 28, *pt.* 3 mm. to 24, 30, 3 . . . . . *T. annulata*.

5. Wings with venation wholly black, except some whitish cross-veins in subcostal and adjacent species; in some specimens a small golden yellow basal spot in hind wing, at most to *Ang*<sub>1</sub>, *Cuq*<sub>1</sub> and one or two cells at membranule; not rarely a light yellow cloud in nodal region; pterostigma deep black with light ochreous line at anal margin; *Ang*  $10\frac{1}{2}$  to  $11\frac{1}{2}$ . Face greenish yellow, frons dull orange with broad shining black basal line. Thoracic dorsum dull yellowish; broad cuneiform, dorsally pointed blackish band on median suture; ventrally narrow, dorsally rather broad blackish band in front of humeral suture. Sides greenish yellow with the usual lines broad, blackish and conspicuously confluent in longitudinal direction. Abdomen comparatively robust, very gradually narrowed to end; light ochreous brown: black lines on mid-dorsal and lateral carinae broad, especially on posterior segments, confluent at terminal joints of segments 7-8; segment 9 black with ochreous antero-lateral spot; 10 wholly black. *Abd.* 24, *hdw.* 31, *pt.* 3 < to 27, 33, 3.5 mm.

*T. Distanti*.

Wings with venation yellowish red to nodal region, blackish more distally; large golden-yellow spot on base, to *Ang*<sub>1</sub> and *Cuq* or slightly more in front wing; to *Ang*<sub>2</sub>, basal side of *t* and anal angle in hind wing; pterostigma very dark ferruginous with light ferruginous narrow line at anal margin. Thoracic pattern similar to preceding species, but colours more like *T. annulata*, and the lateral bands reduced in size and much paler in colour, only the stigmatic line and parts of the sutural lines being black. Abdomen very much like preceding species in outline and elements of pattern; mid-dorsal black line a little narrower; lateral black band more reduced, especially on segments 4-6. *Abd.* 24, *hdw.* 30, *pt.* 3 mm. . . . . *T. pluvialis*.

6. Frons above metallic greenish blue, olivaceous anteriorly. Face light yellow; labrum yellow with median black line. Thoracic dorsum black with cuneiform light yellow antehumeral stripes and similar spots on

ante-alar sinus. Sides light yellow; the usual bands deep black and broadly confluent in longitudinal direction. Abdomen comparatively narrow, almost cylindrical; black with light yellow markings; lateral and dorsal bands interrupted by transverse black carinae on segments 1-3; lateral stripes almost for full length of segments 4-7, nearer to mid-dorsal than to lateral carinae; antero-lateral spots on segment 8. Wings hyaline, venation black; vestige of basal light yellow spot on hind wings; yellow cloud between *t*, nodus and anal margin similar to male, but lighter in colour. Pterostigma long, not distinctly widened, dark ferruginous, faint indication of lighter line at anal margin. *Ang* 9½ . 10½. *Abd.* 22, *hdw.* 27, *pt.* > 3 mm. . . . . *T. stictica*. Frons yellow, at base with broad black, slightly metallic blue band. Otherwise similar to corresponding male. (From older description, not compared for present table.) *Abd.* 27, *hdw.* 29, *pt.* < 3 mm. *T. aureola*.

## TRITHEMIS ARTERIOSA (Burmeister, 1839).

S. Afr. Mus.: 3 ♂ (no locality); 1 ♂, Kafue River, S. Rhodesia; 1 ♂, 1 ♀, Victoria Falls (vii. 1911, L. Péringuey, and 1904, W. L. Slater); 5 ♂, M'Fongosi, Zululand (iii, v, 1911, W. E. Jones); 3 ♂, Waterval, Transvaal (17. ix, 15. xii. 1899; 11. x. 1900); 2 ♂, 2 ♀, Dunbrody, Blue Cliff (ii. 1912); 1 ♂, Umhlali, Natal (i. 1913, K. H. Barnard); Kaapmuiden, Transvaal (xi. 1908, Tucker); Otjituo, Gaub, Gibeon, and Otjiwarongo, S.W. Protectorate (i. 1920, Tucker). Mus. Stockholm: 4 ♂, 7 ♀, Zululand (15, 18. ix, Trägårdh). Coll. K. J. Morton: 1 ♀, Macequece (19. ix. 1908, Miss Fountaine); 1 ♂, Umzinto, Natal (26. iv. 1909, ead.). Coll. E. B. Williamson: 11 ♂, 10 ♀, Salisbury, Mashonaland (iv. 1899; i, ii, iii, x, xi. 1900; iii, v. 1905, Marshall); 2 ♂, 4 ♀, Natal (G. F. Leigh); 3 ♂, 1 ♀, Hilton Road, Natal (21, 24. xii. 1909, *id.*); 20 ♂, 1 ♀, Princetown, Natal (6, 8, 12, 21. xii. 1908; 9, 19. ii, 11, 17. iii. 1909, *id.*). Coll. Ris: 1 ♂, Botchabelo, 1200 m., Transvaal (18. ii. 1914, H. Junod).

This common species is known from the African continent throughout between Algeria and Natal, from Syria, the Canary Islands, Socotra and the Comoro Islands.

There is considerable variation in extent of the golden-yellow basal spot, not strictly depending on geographical distribution; but generally speaking it may be stated that forms with very large patch are more restricted to the inter-tropical parts of the continent, those with smaller patches being prevalent in the northern and southern limits of distribution, though even there specimens with large patches are not altogether absent. Various names have been proposed for these varieties, but it seems much better to relegate those names to synonymy.

## TRITHEMIS ANNULATA (Palisot de Beauvais, 1805).

S. Afr. Mus: Kaapmuiden, Transvaal (xi. 1918, Tucker); 1 ♀, Lorenzo Marques (28. xi. 1911). Coll. Ris: 1 ♂, *ib.* (15. xii. 1911). Coll. Sélys: 1 ♂, 2 ♀, Delagoa Bay.

The area of this species is nearly the same as of *arteriosa*, *i.e.* continental Africa between Algeria, Egypt and Delagoa Bay, Syria, Arabia and the Cape Verde Islands; it is recorded from Sicily and Sardinia (doubtfully from continental Italy), whereas *arteriosa* is not known to inhabit Europe; from Madagascar also we have seen *annulata* but not *arteriosa*. In South Africa it is evidently much less at home than *arteriosa*, and the small number of specimens here recorded may indicate its extreme southern limits.

## TRITHEMIS PLUVIALIS (Förster, 1906).

Brit. Mus.: 1 ♀, Chirinda Forest, Gazaland, 4000 ft. (19. x. 1905, Marshall). Coll. E. B. Williamson: 6 ♂, 4 ♀, Salisbury, Mashonaland (iv. 1900; iii, iv. 1905, *id.*).

Originally described from a single male specimen from Usambara; the description applies perfectly to our specimens. The species appears certainly distinct, having characters in common with *annulata* as well as with *Distanti*, as shown in our tables; the stature and outline of abdomen is much like *Distanti*. The form of genitalia in second segment of male differs from *annulata* (and *arteriosa*) by having the posterior margin of the basal piece of hamule distinctly angulate and the genital lobe considerably narrower, sickle-shaped, resembling the same organ of *T. Distanti*. None of our specimens is fully mature.

## TRITHEMIS KIRBYI ARDENS (Gerstaecker, 1891).

S. Afr. Mus.: 1 ♂ (no locality); 1 ♀, Victoria Falls (1904, W. L. Sclater); 1 ♂, 1 ♀, Bulawayo (C. H. Peard); 1 ♀, Salisbury (23. xii. 1911); 1 ♀, Waterval, Transvaal (15. iv. 1900); 2 ♂, 1 ♀, M'Fongosi, Zululand (iii, x. 1911, W. E. Jones); Usakos, S.W. Protectorate (ii. 1920, Tucker). Coll. K. J. Morton: 1 ♂, Macequece (2. x. 1908, Miss Fountaine). Coll. E. B. Williamson: 2 ♂, Natal (G. F. Leigh).

This brilliant and conspicuous species is known from the African continent south of the desert belt, although probably absent in the equatorial forest zone and evidently more adapted to desert regions. It is also recorded from Madagascar and the Comoro Islands. In the material under discussion only a form of female with almost hyaline



wings is known, as described in our table. From North Nigeria the writer has seen a series of andromorphous females with the wing base almost as brilliant golden yellow as in males; similar females are described from Choa by Förster. The first described specimens of *Trithemis Kirbyi* came from North-Western India and belong to a form with much paler-coloured wing bases.

TRITHEMIS STICTICA (Burmeister, 1839).

S. Afr. Mus.: 1 ♂, Matopos (E. C. Chubb); 1 ♀, Latombo, Salisbury (3. iii. 1912); 1 ♂, Kranspoort, Transvaal (21. xii. 1906); 1 ♂ 1 ♀, White River, E. Transvaal (8. xii. 1909; i. 1910, A. T. Cooke); 1 ♂, Lorenzo Marques (15. x. 1911). Brit. Mus.: 2 ♂, Salisbury (12. xi. 1905, Marshall). Coll. K. J. Morton: 1 ♂, Wolluterkop, Transvaal (i, xii. 1908, Miss Fountaine). Coll. E. B. Williamson: 5 ♂, Princetown, Natal (5, 12. xii. 1908; 18. ii, xii. 1909, G. F. Leigh). Coll. Ris: 1 ♂, Botchabelo, 1200 m., Transvaal (1914, H. Junod).

South African and East African, reaching northwards to Abyssinia; a few specimens are also known from western localities and from Madagascar. Adult males are perhaps the most graceful *Libelluline* dragonflies of the present fauna; the contrast of the very light and brilliant blue thorax, the black and yellow abdomen and the large yellow cloud in the hind wings is a most striking one. The description of the female in our table is made from the specimen from White River, which most certainly belongs to this species.

TRITHEMIS AUREOLA (Ris, 1912).

S. Afr. Mus.: 1 ♂, Inhambane (xii. 1912, K. H. Barnard). Coll. Sélys: 1 ♂, Delagoa Bay.

This species is very imperfectly known, though certainly distinct from its ally *stictica*. The writer has seen but a few more specimens, from Dakar and from Madagascar. In the paper on Schultze's voyage it was given Rambur's name *hova*. But further search demonstrated that this name belonged with much better right to a species of *Pseudomacromia*; a new name had therefore to be given to this *Trithemis*.

TRITHEMIS DISTANTI (Kirby, 1898).

S. Afr. Mus.: 2 ♀, Waterval, Transvaal (16. xi. 1899; 16. xii. 1900); 5 ♂, 6 ♀, M'Fongosi, Zululand (ii, iii, iv, v, ix, x. 1911,

W. E. Jones); 1 ♂, Barkly West (xii. 1893, L. Péringuey); 3 ♂, 1 ♀, Dunbrody, Blue Cliff (ii. 1912). Brit. Mus.: 1 ♂, Salisbury (1904, Marshall); 1 ♀, Mazoe, 4700 ft., Mashonaland (27. xii. 1905, *id.*); 1 ♂, 1 ♀, Willow Grange, Mooi River, Natal (21. i. 1913, R. C. Wroughton). Coll. K. J. Morton: 2 ♂, 1 ♀, King Williamstown, 1 ♀, Stutterheim (2, 4, 16. i. 1908, Miss Fountaine). Coll. E. B. Williamson, 6 ♂, 5 ♀, Salisbury (x. 1899; i, iii, x. 1900; iv. 1905; Marshall); 8 ♂, 3 ♀, Princetown, Natal (6, 8, 10, 12, 19, xii. 1908; 7, 19. ii. 1909, G. F. Leigh); 1 ♂, 1 ♀, Hilton Road, Natal (19, 21. xii. 1909, *id.*).

South African and East African, reaching northward to Abyssinia; also known from Madagascar. Specimens from equatorial West Africa have been considered as racially different by the writer, but they may perhaps be claimed as a distinct species when these forms are better known. *T. Distanti* is one of the characteristic species of the South African fauna; in dealing with *Helothemis dorsalis* we have mentioned its striking resemblance to that species.

### PSEUDOMACROMIA (Kirby, 1889).

An African genus consisting of large species, some of them among the largest of *Libellulinae*. In structural and neural details evidently allied to *Trithemis*, which are only medium-sized species. Part of the species yellow and black or metallic green, by this colour system, large size and general stature resembling the *Corduline* genus *Macromia*. They are evidently strong flyers and not common species, and the genus is therefore very imperfectly known.

In hind wing 4 to 5 rows of cells between  $A_3$  and the wing's edge; 2 rows of cells between *Rs* and *Rspl* in most specimens. Tooth of tarsal claws small, shorter than point of claw. Male: Labium yellowish with broad median black band; face dark olivaceous to blackish; frons very dark metallic violet, narrowly lined with yellow anteriorly and at the sides. Thorax black with metallic green or blue reflections and yellow markings; broad, medially diffuse band in front of humeral suture; narrow incomplete line touching metastigma; two spots between this line and second lateral suture; ventral half of metepimeron. Legs black. Abdomen little widened at base; scarcely contracted at third segment; segments 4-10 almost parallel, triquetral, very gradually narrowed to end. Abdomen black with yellow markings, very light on segments 2-3, turning to ochreous posteriorly; lateral spot on segment 2; narrow basal ring and broad medio-lateral spot on 3-4; 5-8 oval medio-lateral spot and narrow line on mid-dorsal carina, this line sometimes fused to lateral spots; 9-10 black. Wings hyaline or very slightly stained with

yellow, especially along veins. Pterostigma black. Membranule whitish. Female very similar to male; metallic violet of frons reduced, sides and anterior margin broadly yellowish; yellow markings on abdomen more extended, lateral and dorsal elements almost generally confluent; not rarely a blackish spot at base of hind wings between membranule and  $A_3$ . ♂, *Abd.* 40, *hdw.* 45, *pt.* 3.5 mm. ♀, 43, 50, 3.5. . *P. torrida*. In hind wing 3 to 4 (mostly 3) rows of cells between  $A_3$  and the wing's edge; one row of cells between *Rs* and *Rspl*. Tooth of tarsal claws robust, longer than point of claw. Male: Labium light yellow, median lobe black. Labrum light yellow; face and frons anteriorly and laterally very light greenish yellow; frons above metallic blue. Thorax with dense whitish blue pruinosity. Legs dark ferruginous, lighter on first and second femora. Abdomen little widened at base in lateral, more so in dorso-ventral dimension; distinctly contracted at segments 3-4 and slightly fusiform posteriorly. Black; segments 1-3 dorsally whitish blue pruinose; sides of 1-3 light yellow, black at transverse carinae; sides of 4-8 with long and narrow lunulate ferruginous spots which almost touch both ends of each segment; 8 greyish blue pruinose dorsally; 9-10 wholly black. Wings hyaline, slightly stained with greyish yellow from *t* distally. Pterostigma ferruginous. Membranule greyish. Female similar to male; frons yellowish or orange with a basal metallic blue spot of variable extent. No pruinosity on thorax and abdomen; thorax dull ferruginous with coppery and bluish sheen and somewhat indistinct yellow markings: incomplete inferior line in front of metastigma, two spots on metepisternum as well as inferior half of metepimeron. Abdominal segments 1-3 ferruginous with transverse carinae rather broadly black; 4-9 with broad lateral ferruginous band shortly interrupted at joints. Apical part of wings variably stained with light golden yellow, mostly in front wing to nodus in longitudinal, to *Rspl* in transverse dimension, in hind wing to half way between nodus and pterostigma and over the entire breadth of wing. ♀, *Abd.* 35, *hdw.* 36, *pt.* 2.5 mm. to 38, 39, 2.5. ♀, 38, 39, 2.5 to 38, 40, 2.5. . *P. natalensis*.

#### PSEUDOMACROMIA TORRIDA (Kirby, 1889).

S. Afr. Mus.: 1 ♀, M'Fongosi, Zululand (xii. 1911, Jones); 1 ♂, Ceres, Cape (Jan., R. Trimen). Coll. Selys: 1 ♀, Natal. Coll. K. J. Morton: 1 ♂, Zoutpansberg, Transvaal.

Known from the whole African continent south of the desert belt, from the Canary Islands and the Islands of Comoro. Though not yet recorded from Mediterranean Africa, it has recently been found in Spain by Father Navás.

#### PSEUDOMACROMIA NATALENSIS (R. Martin, 1900).

S. Afr. Mus.: 1 ♂, M'Fongosi, Zululand (iii. 1900, W. E. Jones). Brit. Mus.: 1 ♂, Zambesi (12. ix. 1905); 2 ♂, 3 ♀, Chirinda

Forest, Gazaland, 3600–4000 ft. (3, 7, 8, 14, x. 1905, Marshall). Coll. K. J. Morton: 1 ♂, Macequece (2. x. 1908, Miss Fountaine). Coll. R. Martin: 1 ♀, Natal. Coll. E. B. Williamson: 1 ♀, Hilton Road, 3800 ft., Natal (28, xii. 1909, G. F. Leigh). Mus. Tervueren: 2 ♂, Kapiri, Katanga (x, xi. 1912, Legros).

The male was described by Förster as *Zygonyx komatina* from Komatipoort, Transvaal. No other records are known to the writer. From what is known, this species is decidedly South African.

### OLPOGASTRA (Karsch, 1895).

Allied to the preceding genus and restricted to tropical Africa and Madagascar; the small number of species is very imperfectly known.

Abdomen a little longer than hind wings, very much widened at base, extremely slender from segment 3 posteriorly. Teeth of tarsal claws very minute, even absent in some specimens. Male: Labium light yellow with median lobe black; labrum black; ante- and post-clypeus yellow with a black line at the suture between both pieces; frons above brilliant metallic blue with a ferruginous ground-colour showing through, narrowly yellow at anterior margin. Thorax brilliant metallic green with light yellow markings; incomplete line at median suture; antehumeral lines to two-thirds height; transverse lines at ante-alar sinus; two round spots in front of humeral suture; two large elliptical spots on mesepimeron; ventral band and dorsal round spot on second lateral suture; large, roughly triangular anterior spot and two small round posterior spots on metepimeron; round spots on mesinfraepisternum and metinfraepisternum. Legs black, abdomen black with yellow markings; latero-ventral spot and dorsal ring on segment 2; complete narrow anterior ring on 3; segments 4–7 with small, dorsally interrupted basal ring, slightly elongate on 7. Genital lobe produced into a large contorted spine. Wings stained with greenish yellow from triangular region distally; second pair deeper yellow in the region between *t*, *nodus* and anal margin; apex narrowly and diffusely lined with brown; second pair with deep brown basal spot, vestige in *sc*, almost to *Cu*q in *cu* and one or two cells at membranule. Pterostigma dark brown; membranule black. 15½ *Aug*. Female very similar to male. ♂ ♀, *Abd.* 43, *hdw.* 42, *pt.* 2.5 mm. . . . . *O. lugubris*.

Abdomen distinctly shorter than hind wing, much widened at base, more robust posteriorly than in preceding species, and slightly fusiform. Teeth of tarsal claws of ordinary size, shorter than the point. Male: Labium and labrum ochreous; face and frons very light olivaceous; at base of frons a broad black band with metallic blue reflections. Vertex black at base, light olivaceous at summit. Thorax very dark brown with metallic green and blue sheen and rather dull ochreous markings; broad antehumeral band to two-thirds of the height; a ventral band and dorsal round spot in front of humeral suture; a sinuate line at metastigma;

metepisternum almost entirely ochreous; latero-ventral and indistinct dorsal spot on metepimeron. Very slight whitish pruinosity on entire thorax. Legs black. Abdomen black, with ochreous markings; latero-ventral spot on segment 2, this segment dull olivaceous or ferruginous dorsally; narrow ring at transverse carinae of 3; 4-7 triangular spots at middle of lateral carina corresponding to transverse ochreous bands on ventral surface; such band also on segment 8 and a vestige on 9; narrow light yellow line on mid-dorsal carina of segments 4 to 10. Genital lobe broadly trapezoid. Wings hyaline, faintly greyish yellow from triangular region distally. Dark brown spot at base of second pair; vestige in *sc*, half way to *Cuq* in *cu*, 1-2 cells at membranule. Pterostigma brownish black; membranule black. Female very similar to male. 12-13 Anq. ♂, *Abd.* 32, *hdw.* 39, *pt.* > 4 mm. ♀, 35, 38, 5.

*O. Fuelleborni.*

**OLPOGASTRA LUGUBRIS (Karsch, 1895).**

S. Afr. Mus.: 1 ♂, Ovampoland.

Known by a small number of specimens from tropical Africa, East and West, reaching to Nubia. A most elegant and conspicuous insect.

**OLPOGASTRA FUELLEBORNI (Grünberg, 1902).**

S. Afr. Mus.: 2 ♂, M'Fongosi, Zululand (ii, iii. 1911, W. E. Jones); White River, Transvaal (Cooke); Kaapmuiden, Transvaal (xi. 1918, Tucker).

The type male from Nubia, female from Nyasaland and the specimens here recorded are all that is at present known of this species. A few specimens from the Belgian Congo belong to a subspecies differing in the larger size, more robust stature and some details in colour and pattern.

**PANTALA (Hagen, 1861).**

This and the two following genera have in common a particular structure of hind wings with exceptionally broad and also thin and flexible anal field. Corresponding to this structure we find in them a faculty of planing or sailing flight, which faculty is probably responsible for the excessively wide distribution of some members of this group. *Pantala* includes two species only, one cosmopolitan, the other one American.

**PANTALA FLAVESCENS (Fabricius, 1798).**

S. Afr. Mus.: 1 ♀, Gwaai, S. Rhodesia (15. ii. 1912); 1 ♂, 1 ♀, Salisbury (17. xii. 1911); 1 ♂, Pietersburg, Zoutpansberg District,

Transvaal (15 . xii . 1902); 1 ♂, Waterval, Tv. (14 . x . 1900); 3 ♂, Barberton, Tv.; 2 ♂, M'Fongosi, Zululand (iii, x . 1911); 1 ♀, Lorenzo Marques (28 . xi . 1911); Otjituo, Gaub, Tsintsabis, Namutoni, Otjiwarongo, Nuragas, and Gamies, S.W. Protectorate (i . 1919, Lightfoot, ii . 1921, Barnard, and i . 1920, Tucker). Coll. E. B. Williamson: 12 ♂, 2 ♀, Salisbury (iv . 1899; x, xi, 1900; v . 1905, Marshall); 1 ♂, Princetown, Natal (14 . ii . 1909, G. F. Leigh); 4 ♂, 1 ♀, woodside off Umbilo Road, Congella, Natal (12-21 . x . 1904; 17 . i . 1905, *id.*).

♂. Lips ochreous. Face, frons and vertex light yellowish, often a light red diffuse spot in centre of face and inferior part of frons. Thoracic dorsum golden brown; sides pale whitish or bluish green with black dots in the sutures. Abdomen light yellowish to light yellowish red, carinae narrowly blackish; on mid-dorsal carinae of segments 8-10 rhomboid black spots; ventral surface whitish with a bluish or greenish shade on segments 1-4, ochreous posteriorly, each segment with somewhat diffuse, mostly interrupted, brown lateral stripes. Wings hyaline; a light golden-yellow spot of variable extent in base of anal field in hind wing; mostly between  $Cu_1$ , base of  $A_3$ , supplementary sector of  $A_3$  and anal angle. Tips light brown in most specimens, broader in hind wing, maximally to about half-way between distal end of pterostigma and apex of wing. Pterostigma light ferruginous. Membranule white.

Female very similar to male. Colour a trifle duller, sometimes with an olivaceous shade. Basal yellow spot of hind wings paler and more diffuse.

♂, ♀, *Abd.* 32, *hdw.* 39, *pt.* 2.5 mm. in front wing, 2 in hind wing.

An extremely common cosmopolitan species; chiefly inter-tropical, but recorded as far north as Kamtschatka, Massachusetts and Wisconsin; not yet observed in Europe or Mediterranean Africa, except Egypt; found on many oceanic islands and repeatedly observed on ships far from shore.

### RHYOTHEMIS (Hagen, 1867).

A genus of many, often beautifully coloured species, most of them Asiatic, a few African and Australian, chiefly tropical, a small number of species also sub-tropical.

1. Both pairs of wings coloured at base at least to nodal region. Hind wings not contracted at apex of anal loop . . . . . 2  
Front wings hyaline, fumose greyish in *sc* to  $Anq_1$ , in *cu* to  $Cuq$ ; hind wings at base deep black with violet, cupreous and greenish metallic

sheen to about half way between distal angle of *t* and nodus; limits of black colour sharp, lacerate. Both wings faintly greyish yellow between triangular region and apex in very mature specimens. Anal margin of hind wings contracted at apex of anal loop, very broadly rounded proximally. Two rows of cells between *Rs-Rspl*. Pterostigma very small, blackish to ferruginous. Body black, dull ferruginous on face, sides of thorax and of basal segments of abdomen; frons metallic violet or blue. Female shorter in body and with comparatively broader wings; otherwise the sexes very similar. ♂, *Abd.* 19, *hdw.* 27, *pt.* 1.5 mm. to 22, 30, 1.5. ♀, 16, 25, 1 to 19, 30 > 1 . . . . . *Rh. semihyalina*.

2. Colour on wings wholly black with metallic violet sheen. Two rows of cells between *Rs-Rspl*. Black to middle of pterostigma in front wing, to distal end of pterostigma, and at anal margin narrowly to apex in hind wing; anal margin from anal angle to a little beyond *M*<sub>1</sub> narrowly hyaline in both wings; hyaline incomplete transverse bands at distal side of *t*, and distally from nodus; group of hyaline cells with black along the veins in anal field of hind wings at both sides of *A*<sub>2</sub>; vestiges of 2 or 3 longitudinal subhyaline bands between proximal margin and *A*<sub>3</sub> in hind wing. Pterostigma black. Body black; frons metallic blue, face dull olivaceous. Female similar, but with hyaline parts of wing pattern more extended. ♂, *Abd.* 18, *hdw.* 25, *pt.* 2 mm. ♀, 16, 23, 2 . . . . . *Rh. fenestrina*.  
Wing bases light golden yellow, with an intricate pattern of blackish bands and spots distally to nodus in front wing, to one-third the distance between nodus and pterostigma in hind wing. One row of cells between *Rs-Rspl*. Pterostigma very small, greyish ochreous. Body black with metallic green reflections; a light yellow transverse line on suture of frons and postclypeus. Female very similar to male. ♂, *Abd.* 18, *hdw.* 23, *pt.* 1.5 mm. ♀, 16, 24, 1.5. . . . . *Rh. mariposa*.

#### RHYOTHEMIS FENESTRINA (Rambur, 1842).

S. Afr. Mus.: 1 ♂, N. Ovampoland, Otiembora (20. xi-3. xii. 1887, A. W. Erikson).

A species from tropical Africa, West and East, evidently not a common one, and known by a limited number of specimens. The present male is similar to others from Sierra Leone and Nigeria.

#### RHYOTHEMIS MARIPOSA (Ris, 1913).

S. Afr. Mus. (and Coll. Ris): 3 ♂, Otiembora (xi. 1887, A. W. Erikson). Brit. Mus.: 1 ♀, N.E. Rhodesia, 4700 ft. (1904).

The specimens here recorded are all that is known of this most elegant small species.

#### RHYOTHEMIS SEMI-HYALINA (Desjardins, 1832).

S. Afr. Mus.: 1 ♂, 2 ♀, Lorenzo Marques (30. ix, 29. xi, 12. xii. 1911); 1 ♂, Inhambane (xii. 1912, K. H. Barnard); 1 ♂, 1 ♀, Boksburg,

Transvaal; 1 ♀, Port Shepstone, Natal; St. Lucia Bay, Zululand (x. 1919, Bell-Marley). Brit. Mus.: 1 ♀, Pretoria. Coll. K. J. Morton: 1 ♂, Delagoa Bay (7. xi. 1907, Miss Fountaine). Coll. Ris: 2 ♂, 2 ♀, Delagoa Bay (12. xii. 1911); 1 ♂, Rikatla, Delagoa Bay (1914, H. Junod). Coll. E. B. Williamson: 1 ♀, woodside off Umbilo Road, Congella, Natal (G. F. Leigh).

Found in all parts of the African continent, in Syria and on many islands of the Indian Ocean; a closely-allied species occurs in Ceylon, South India, Malacca and Borneo. Various names have been given to individual varieties, sexually different specimens and stages of maturity. The writer's experience fully justifies the relegation of these names into synonymy.

#### TRAMEA (Hagen, 1861).

Similar to *Pantala* in size, outline and general aspect, but with important differences in neural and structural details. A moderate number of species, most of them intertropical in the Old World and America, some extremely wide-ranging and polymorphous, having given rise to a number of doubtfully valid names.

Base of hind wings with a broad, golden-yellow spot, to anal angle and distally to end of *t*, and a few cells in discoidal field. Within this yellow spot a broad, roughly semicircular dark band, very dark reddish brown, with reddish veins in male, black with yellow veins in female, constricted or interrupted between anal angle of *t* and *A*<sub>2</sub> in male, interrupted at same place in female. Venation reddish to nodus, blackish more distally; pterostigma light red; membranule white. Male: Face dull ochreous. frons bright red with broad basal band black with metallic blue reflection. Thorax golden brown with an olivaceous shade and some blackish dots at the sutures. Abdomen light red, very narrowly black at the joints; broad black dorsal spots on segments 8-10. Female: Frons orange with basal black band similar to male; olivaceous shade of thorax more distinct; abdomen reddish ochreous; black lines at joints distinctly broader than in male. Neuration darker. ♂, *Abd.* 31, *hdw.* 42, *pt.* > 2, 1.5 mm. ♀, 32, 42, 2.5, 2.5. . . . . *T. basilaris*. Base of hind wings in male with a dark reddish-brown, red-veined spot; in *c*, *sc* and *m* about half way to *Anq*<sub>1</sub>, in *cu* to *Cuq* or a little beyond; distal limit a straight transverse line to anal margin, vertically to *Cu*. In female the corresponding spot mostly smaller, not fully to anal margin, diffusely lined with golden yellow, indented at apex of membranule by a subhyaline spot. Venation red to slightly beyond nodus, gradually darker distally. Pterostigma red; membranule white. Male: Face dull ferruginous; frons brilliant metallic violet almost to anterior margin. Thorax rich golden brown with blackish, slightly metallic vestiges in the sutures. Abdomen red, part of carinae very narrowly



lined with black; broad black dorsal spots on segments 8-10. Female: Face dull ochreous; frons orange, superiorly about basal half black with metallic blue reflection. Thorax and abdomen lighter in colour than in male. ♂, *Abd.* 32, *hdw.* 40, *pt.* 2.5 < 2 mm. ♀, 30, 41, 2.5, 2 *T. limbata*.

TRAMEA BASILARIS (Palisot de Beauvais, 1805).

S. Afr. Mus.: 1 ♂, Lorenzo Marques (J. da Costa); Grootfontein, Tsumeb, Sandup, Ondongua, S.W. Protectorate (i. 1920, Tucker, and ii. 1921, Barnard). Coll. E. B. Williamson: 1 ♂ ♀ *in cōp.*, 3 ♂, Salisbury, Mashonaland (xi. 1900, Marshall). Coll. Sélys: 2 ♂, 3 ♀, "Afrique australe."

Known from intertropical Africa, East and West, and from some islands of the Indian Ocean in a form of little variability. A slightly different form from India and Ceylon.

TRAMEA LIMBATA (Desjardins, 1832).

Coll. Sélys; 3 ♂, Delagoa Bay. Coll. K. J. Morton: 1 ♂, Natal.

*T. limbata*, in the wide application given to this name by the writer, means a species highly polymorphic in colour of wing base and of frons, but structurally homogeneous, ranging between Senegal in W. Africa and the islands of Samoa in the Pacific Ocean throughout the inter-tropical region. Forms from continental Africa were named *T. continentalis* by de Sélys, those from Delagoa Bay and Natal *T. limbata* *a*<sup>2</sup> by the writer.

UROTHEMIS (Brauer, 1868).

A genus of tropical African and Asiatic distribution, including a small number of forms. Similar in outline and facies to *Crocothemis*, but there is no real affinity to that genus; neural details and the genital structure of both sexes demonstrate close relations to the *Tramea* group.

♂. Thorax and abdomen wholly black, with dark greyish-blue pruinosity, not covering on abdomen a broad mid-dorsal black line, which is widened at terminal joint of each segment. Labium ochreous with indistinct median fuscous band; labrum black; anteclypeus light olivaceous; postclypeus and frons black, narrowly light yellow at sides. Wings hyaline, very lightly stained with yellowish, narrowly and diffusely brownish at tips. Base of hind wings with a deep blackish-brown spot of variable size, in most specimens in *c* and *sc* half way to *Anq*<sub>1</sub>, vestige in *m*, in *cu* to *Cuq* or slightly beyond, to somewhat more than half way between apex of membranule and anal angle; limits of spot indented

by golden-brown lining of veinlets; small golden-brown vestige in base of front wing. Part of longitudinal veins and most cross-veins in costal field light yellow. Pterostigma very light yellow between black veins. Immature males similar in colour to females. ♀. Thorax greyish ochreous, sides pale yellow, some black dots at the sutures. Abdomen light ochreous, segments 1-2 dorsally blackish; 3-10 with broad median black band, widened at terminal joint of each segment. Labium and labrum whitish, face very light greenish, frons light yellow with black basal line. Wings similar to male, but with basal spot light yellow to deep golden yellow, with blackish, yellow-veined central irregularly semicircular band, which is mostly interrupted between anal angle of  $t$  and  $A_2$ . This basal, yellow and black spot very variable in extent, in some specimens not larger than that above described in the male, in others extending fully to distal end of  $t$  and anal angle. Yellow basal spot in front wing from vestiges to fully to  $Anq_2$  and arculus. ♂, *Abd.* 25, *hdw.* 34, *pt.* 3 mm. ♀, 28, 36 < 4. *U. Edwardsi*. ♂. Thorax reddish golden brown, abdomen red with narrow black mid-dorsal line on segments 4-7, broader on 8-9. Labium ochreous; labrum orange; face and frons dull red, a narrow black basal line on frons. Wings similar to preceding species; more diffusely greyish at tips; venation mostly red. Basal spot of hind wings generally considerably larger, deep reddish brown, with red veins, rather broad ( $1\frac{1}{2}$  cells) golden-yellow margin and a diffuse central golden-yellow spot; mostly to  $Anq_2$ , distal end of  $t$ , and half way between apex of membranule and anal angle in hind wing; in front wing golden-yellow spot to  $Anq_1$  and  $Cuq$ . Pterostigma light yellow between black veins; membranule dull ferruginous. ♀ similar to ♂. Colour of abdomen more reddish ochreous than red; dorsal black line generally a trifle larger. Basal spot of hind wings similar in size, but golden-yellow margins broader, and especially golden-yellow central spot lighter and much larger than in male. ♂, *Abd.* 27, *hdw.* 37, *pt.* 3.5 mm. ♀, 21, 37, 4

*U. assignata*,

#### UROTHEMIS EDWARDSI (Sélys, 1849).

S. Afr. Mus.: 1 ♀, Inhambane, and 1 ♀, Chinde (xii. 1912, K. H. Barnard). Coll. Sélys: 1 ♀, Delagoa Bay; 1 ♀, Natal. Coll. K. J. Morton: 1 ♀, Delagoa Bay (5. xi. 1907, Miss Fountaine).

Found in all parts of inter-tropical Africa. The type-specimen came from Algeria, but the species has not been found there again for more than seventy years. In the ♀ from Inhambane the basal spot in hind wings is exceptionally small and the yellow colour very light.

#### UROTHEMIS ASSIGNATA (Sélys, 1872).

Coll. Sélys: 1 ♂, Delagoa Bay; 1 ♀, Cap (very old specimen, sent by Drège). Brit. Mus.: 1 ♀, N.E. Rhodesia, Upper Luangwa River

(27. vii, 13. viii. 1910, S. A. Neave). Coll. Ris.: 1 ♀, Rikatla, Delagoa Bay (1914, H. Junod).

Widely distributed in inter-tropical Africa; a slightly modified form occurs in Madagascar.

### TETHRIAMANTA (Kirby, 1889).

Distribution the same as *Urothemis*. Tiny little insects which may be called a minute edition of *Urothemis*.

### TETHRIAMANTA REZIA (Kirby, 1889).

Coll. Sélvs: 1 ♂, Delagoa Bay.

♂. Labium black, with sides narrowly yellowish. Labrum black with yellowish spot. Face yellowish red; frons and vertex red; narrow black basal line on frons. Thoracic dorsum reddish golden-brown, sides and ventral surface lighter, two blackish transverse bands on ventral sutures. Abdomen scarlet-red, narrow black lines at carinae; segments 3-10 with narrow, black mid-dorsal line, widened at terminal joint of each segment; ventral surface yellowish-red with small square, blackish spots at latero-posterior angle of each segment. Wings hyaline; golden-yellow basal spot in hind wing to  $Anq_{1-2}$ ,  $Cuq$  or proximal side of  $t$ , half way between apex of membranule and anal angle or fully to anal angle; within this yellow spot mostly dark golden-brown stripes in  $sc$  to  $Anq_1$  and  $Cuq$ , or in  $cu$  to  $Cuq$ ; sometimes also a brown central spot in anal field. Base of front wing golden yellow to  $Anq_1$  and  $Cuq$  or slightly more distally. Pterostigma very small, red; membranule blackish. Female very similar to male, but dark stripes in yellow basal spot absent.

♂, *Abd.* 18, *hdw.* 21, *pt.* 1.5 mm. ♀, 16, 20, 1.5.

Distribution almost exactly the same as in *Urothemis assignata*; but it seems a rare species, of which only a very small number of examples are to be found in our collections.

## APPENDIX.

A number of species enumerated in the writer's compiled catalogue of South African Odonata (*vide* Introduction, p. 245) are not included in the present work, which is exclusively founded on actual specimens in the writer's hands. These species are registered as follows:

1. *Lestes tridens* (MacLachl., 1895), *l. c.*, p. 308, no. 6.—The description, made from one male from Delagoa Bay, does not apply to any species known to the writer.

2. *Lestes obscurus* (Kirby, 1898, 1905), *l. c.*, p. 308, no. 7.—Mr. Herbert Campion writes to me (9. xii. 1913) that the specimens so described by Kirby are identical with *L. plagiatus*.

3. *Metacnemis angusta* (Selys, 1863, 1886), *l. c.*, p. 310, no. 15.—Described from a single female, "Cap de Bonne Espérance, de l'ancienne collection Latreille."

4. *Argia concinna* (Ramb., 1842), *l. c.*, p. 310, no. 17.—This species is known from the original pair alone, said to be from "Cap" (de Bonne Espérance). I have seen the pair; it is similar in facies to its American congeners of the type *fissa*, *oculata*, etc. But the configuration of the apical border of the tenth segment of ♂ is peculiar, as

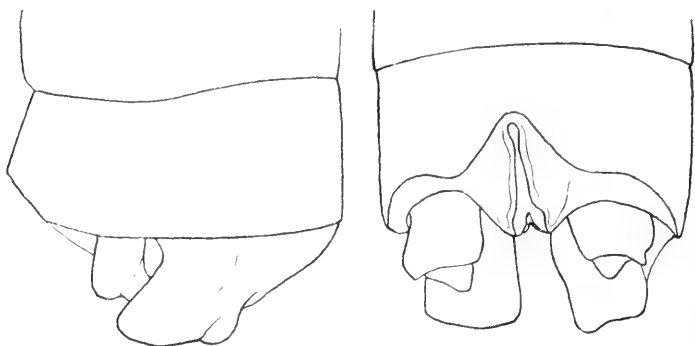


FIG. 77.—*Argia concinna*. ? Cape. Appendages, right side and dorsal view.

described and remarked upon by Selys (1865) and shown by Hagen's figures (published by Calvert, 1902). None of the numerous species of *Argia* known to the writer is similar to *concinna* in this structure. The possibility, though perhaps not the probability, remains open that this species, though belonging to an otherwise strictly American genus, is really African.

5. *Enallagma oblitteratum* (Selys, 1876), *l. c.*, p. 314, no. 21.—This is almost certainly a colour variety of *E. glaucum* (see p. 326, *ante*).

6. *Pseudagrion Kersteni* (Gerstäcker, 1869), *l. c.*, p. 315, no. 26.—The specimens (1 ♀, 1 incomplete ♂) from South Africa under this name (*l. c.*, p. 316) are very probably *P. natalense* of the present paper (*ante*, p. 307).

7. *Pseudagrion Deckeni* (Gerstäcker, 1869), *l. c.*, p. 316, no. 27.—Karsch has decided (1893) for the identity of Selys' *P. praetextatum*

with *Deckeni*; but this identity is not certain. Karsch's own figure of a male superior appendage is not in favour of his view. I have therefore preferred the Sclysian name (*ante*, p. 305) for which the types could be examined. The question of synonymy opened by Karsch must be left for further investigation.

8. *Pseudagrion Hageni* (Karsch, 1893), *l. c.*, p. 317, no. 28.—No description exists of this species; it is only founded on a figure of a male superior appendage, drawn from an old specimen from the "Cape" mentioned by Sclys under *praetextatum*, not from the specimen but from a description by Hagen. I cannot locate this figure, unless it belongs to *P. angolense* of Sclys and of the present paper (*ante*, p. 302).

9. *Disparoneura glauca* (Sclys, 1860), *l. c.*, p. 318, no. 31.—The name of *Agrion glaucum* (Burmeister, 1839) had to be transferred from *Disparoneura* to *Enallagma*, and a new name substituted for the *Disparoneura*; as evidently the same species registered here as *D. mutata* had been described and figured under this name by Sclys, 1886, and by Calvert, 1895, the name *mutata* could be adopted for our specimens (*ante*, p. 293).

10. *Disparoneura frenulata* (Sclys, 1860), *l. c.*, p. 318, no. 32.—Described from specimens from the Cape. Our material contains but one species of *Disparoneura* from South Africa; accepting the name *mutata*, we suppose *frenulata* to be distinct; should it prove to be identical (the types must be at Cambridge, Massachusetts), the latter name would have priority.

11. *Ictinus pugnae* (Sclys, 1854), *l. c.*, p. 320, no. 38.—This species, recorded from "Port Natal" in the original description, is unknown to the writer.

12. *Anax dorsalis* (Burm., 1839), *l. c.*, p. 323, no. 40.—The writer has shown in an earlier paper ('Ann. Soc. Ent. Belg.,' lv, p. 323, 1911) that this name is very probably without foundation; the original description applies either to *A. imperator mauricianus*, or more probably to an erroneously identified American species—*A. junius*, Dry., ♀. Kirby's specimens named *dorsalis* are *A. speratus*; R. Martin's ♂ *dorsalis* is an erroneously identified American *A. longipes*, Hag.

13. *Aeschna dolabrata* (Karsch, 1899), *l. c.*, p. 325, no. 47.—The identity of this species with *A. minuscula* appears probable (*ante*, p. 364).

14. *Gynacantha bispina* (Ramb., 1842), *l. c.*, p. 325, no. 48.—The pair of *G. villosa* described and figured in the present paper (*ante*, p. 358) was formerly identified as *bispina*, an error that was afterwards rectified by comparison with Rambur's species in the Sclysian Collection.

15. *Brachythemis lacustris* (Kirby, 1889), *l. c.*, p. 336, no. 46.—Mr. Herbert Champion writes to me (19.xii.1914) that the specimens from the Transvaal described under this name are not this species, but *Trithemis Kirbyi ardens*.

16. *Trithemis hova* (Ramb., 1842), *l. c.*, p. 339, no. 70.—Rambur's name had to be transferred to a species of *Pseudomacromia*, and was substituted in *Trithemis* by the new name *aureola* (*ante*, p. 427).

17. *Pseudomacromia komatina* (Forster, 1906), *l. c.*, p. 342, no. 76.—This name is evidently a synonym of *P. natalensis* (*ante*, p. 429).

Of the 17 species in the present list 3 are South African species not seen by the writer (1, 3, 11), 2 are of doubtful origin (4, 12—the latter also is a synonym), 12 are certainly or probably synonyms, or erroneously identified specimens (2, 5, 6, 7, 8, 9, 10, 13, 14, 15, 16, 17).

## SYSTEMATIC ARRANGEMENT OF GENERA AND SPECIES.

### I. SUBORDER ZYGOPTERA.

#### I. A. FAMILY CALOPTERYGIDAE.

Gen. LIBELLAGO.

caligata.

Gen. PHAON.

iridipennis.

#### I. B. FAMILY AGRIONIDAE.

##### I. Ba. SUBFAM. LESTINAE.

Gen. LESTES

ictericus.

ochraceus.

Wahlbergi.

virgatus.

amicus.

plagiatus.

uncifer.

Gen. CHLOROLESTES.

conspicua.

Peringueyi.

umbrata.

fasciata.

fessellata.

longicauda.

##### I. Bc. SUBFAM. AGRIONINAE.

Gen. ALLOCNEMIS.

leucosticta.

Gen. CHLOROCNEMIS.

Marshalli.

Gen. DISPARONEURA.

mutata.

Gen. METACNEMIS.

valida.

Gen. PSEUDAGRION.

furcigerum.

caffrum.

angolense.

praetextatum.

salisburyense.

natalense.

acaciae.

massaicum.

Sjöstedti.

Gen. CERIAGRION.

glabrum.

suave.

Gen. ENALLAGMA.

subfurcatum.

rotundipenne.

nigridorsum.

elongatum.

glaucum.

schultzei.

fractum.

sinuatum.

subtile.

- Gen. ISCHNURA.  
senegalensis.  
Gen. AGRIOCNEMIS.  
exilis.

II. SUBORDER ANISOPTERA.

II. C. FAMILY AESCHINIDAE.

II. Ca. SUBFAM. GOMPHINAE.

- Gen. PODOGOMPHUS.  
praetorius.  
Gen. MESOGOMPHUS.  
Hageni.  
elpidius.  
cognatus.  
Gen. CRENIGOMPHUS.  
Hartmanni.  
Gen. ONYCHOGOMPHUS.  
supinus.  
Gen. CERATOGOMPHUS.  
pictus.

II. Cb. SUBFAM. AESCHININAE.

- Gen. GYNACANTHA.  
villosa.  
manderica.  
Gen. AESCHNA.  
subpupillata.  
minuscula.  
Gen. ANACIAESCHNA.  
triangulifera.  
Gen. ANAX.  
speratus.  
imperator mauricianus.  
tristis.  
georgius.  
Gen. HEMIANAX.  
ephippiger.

II. D. FAMILY LIBELLULIDAE.

II. Da. SUBFAM. CORDULINAE.

- Gen. MACROMIA.  
picta.  
thetis.  
clymene.

II. Db. SUBFAM. LIBELLULINÆ.

- Gen. NOTIOTHEMIS.  
Jonesi.  
Gen. ORTHETRUM.  
trinacria.  
icteromelas.

- caffrum.  
chrysostigma.  
Abbotti.  
guineense.  
brachiale.  
stemmale capense.  
farinosum.

Gen. PALPOPLEURA.

- lucia.  
jucunda.  
deceptor.

Gen. CHALCOSTEPHIA.

- coronata.  
flavifrons.

Gen. HEMISTIGMA.

- albipuncta.

Gen. PORPAX.

- asperipes.

Gen. ACISOMA.

- panorpoides.  
ascalaphoides.

Gen. DIPLACODES.

- exilis.  
Lefebvrei.

Gen. CROCOTHEMIS.

- divisa.  
saxicolor.  
sanguinolenta.  
erythraea.

Gen. BRADINOPYGA.

- cornuta.

Gen. BRACHYTHEMIS.

- leucosticta.

Gen. SYMPETRUM.

- Fonscolombei.

Gen. PHILONOMON.

- luminans.

Gen. HELOTHEMIS.

- dorsalis.

Gen. TRITHEMIS.

- arteriosa.  
annulata.  
pluvialis.  
Kirbyi ardens.  
stictica.  
aureola.  
Distanti.

## Gen. PSEUDOMACROMIA.

torrida.

natalensis.

## Gen. OLPOGASTRA.

lugubris.

Fuelleborni.

## Gen. PANTALA.

flavescens.

## Gen. RHYTHEMIS FENESTRINA.

mariposa.

semihyalina.

## Gen. TRAMEA.

basilaris.

limbata.

## Gen. UROTHEMIS.

Edwardi.

assignata.

## Gen. TETHRIAMANTA.

rezia.

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(13) *Idem.*—“Synopsis des Agrionines, Quatrième légion: Platycnemis” (*ibid.*, 2<sup>me</sup> série, tome 16, no. 8), pp. 32, Bruxelles, 1863.

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Note on the Life-history of *Chlorolestes conspicua*.—By K. H. BARNARD, M.A., F.L.S., Assistant Director.

ALTHOUGH this species is common near the mountain streams on Table Mountain and the Hottentots Holland Mountains, I have only once observed the method of oviposition, namely in one of the well-wooded kloofs in the latter mountains. The female was seen (March, 1919) puncturing the young green shoots of the trees (*Ilex capensis*) overhanging and about five feet above the stream.

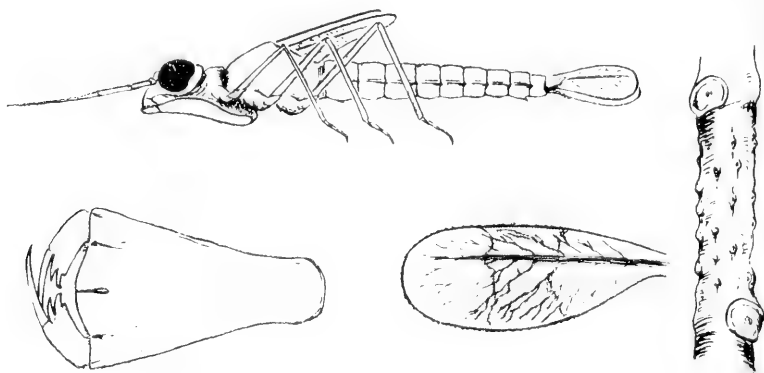
As a rule about five or six punctures are made at intervals of one-eighth of an inch or so along the twig, but without any great regularity. These punctures cause slight gall-like swellings, and the old ones are

observable for some little distance up the branches. Only a single egg is laid in each puncture.

In localities where there are no overhanging trees the eggs must be deposited in the stalks of rushes, small bushes, etc., but I have not yet succeeded in finding any in such situations.

The larva grows to a length of about 35 mm., and is brown or greeny-brown, more or less mottled with darker and lighter patches. The caudal gills have a broad transverse dark band across the middle.

The body is slender. Eyes very prominent. Pedicel of antenna slender and elongate. Labium extending back to bases of second pair of legs; mentum oblong, narrowing posteriorly, median lobe not very



*Chlorolestes conspicua.*

Larva, mask and caudal gill. Twig showing punctures for insertion of eggs. All enlarged.

prominent, bilobed with rather deep almost closed cleft; lateral lobes moderately slender, ending in two teeth, the inner longer than the outer, movable hook long and slender; no mental or lateral setae. Legs slender. Abdomen strongly keeled laterally. Caudal gills simple, broadly ovate, apically rounded, secondary tracheae oblique.

In habits the larva lives very openly and swims freely, preferring a clear stony or sandy bottom with not too much vegetation.

The similarity of the larva to that of *Synlestes* is apparent, and fully confirms the correctness of Ris' proposal (*supra*, p. 268), based on the wing structure of the imago, to remove *Chlorolestes* from the *Agrionidae* and to place it in the *Lestidae*.

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## EXPLANATION OF PLATES V—XII.

## PLATE V.

FIG.

1. *Hemianiax ephippiger*. Venation of *Anisoptera*. Lettering of veins in front wing, of spaces in hind wing. *C*. Costal. *Sc*. Subcostal. *R + M*. Common stalk of radial and medial. *Cu*. Common stalk of cubital. *A*. Anal. *R*. Radial. *Rs*. radial sector. *Rsa*. Second branch of radial sector (in *Aeschninæ*). *Rspl*. Radial supplement. *B*. Bridge from base of radial sector to medial. *M<sub>1-4</sub>*. Common stalks and branches of medial. *Mspl*. Medial supplement. *Cu<sub>1</sub>* and *2*. Branches of cubitus. *Anq*. Antenodal cross-veins. *Pnq*. Postnodal cross-veins. *Arc*. Arculus. *Nod*. Nodus. *Pt*. Pterostigma. *c*. Costal. *sc*. Subcostal. *m*. Medial. *cu*. Cubito-anal. *t*. Triangle. *ht*. Supra-triangle. *al*. Divisions of anal loop. *df*. Discoidal field. *mbr*. Membranula. *A<sub>1-3</sub>*. Branches of anal vein in hind wing. *Obbr*. Oblique vein at distal end of bridge, bridge between  $\bigcirc$  and  $\bigcirc$ .
2. *Metacnemis valida*. Venation of *Zygoptera*. Lettering as in fig. 1. A part of anal vein between petiole of wing and *Cu<sub>2</sub>*. *Q*. Quadrangle.

## PLATE VI.

FIG.

1. *Libellula fulva*. Nymph (European). Tracheation in nodal region: origin and crossing of *Rs<sub>1</sub>* and formation of bridge.
2. *Libellula fulva*. Nymph. Tracheation in triangular region: inflection of cubital fork (front wing).
3. *Libellula fulva*. Nymph. Tracheation in triangular region: inflection of cubital fork (hind wing).
4. *Calopteryx virgo*. Nymph (European). Tracheation: absence of radial crossing and inflection of cubital fork (left side).
5. *Ischnura elegans*. Nymph (European). Tracheation: reduced form of zygopterous venation (right side).
6. *Libellago caligata*. M'Fongosi. Upper ♂, lower ♀.
7. *Phaon iridipennis*. ♂. Natal.
8. *Lestes plagiatus*. ♀. M'Fongosi.

## PLATE VII.

FIG.

1. *Chlorolestes conspicua*. ♂. Cape.
2. „ „ „ ♀. Cape.
3. „ *peringueyi*. ♂. Ceres.
4. „ *fasciata*. ♂. Albert District.
5. „ *tessellata*. ♂. Cape.
6. „ *longicauda*. ♂. M'Fongosi.



FIG.

7. *Allocnemis leucosticta*. ♂. Barberton.
8. *Chlorocnemis marshalli*. ♂. Mazoe.
9. *Disparoneura mutata*. ♀. M'Fongosi.
10. *Metacnemis valida*. ♀. King Williamstown.

PLATE VIII.

FIG.

1. *Pseudagrion natalense*. ♂. M'Fongosi.
2. *Podogomphus praetorius*. ♂. M'Fongosi.
3. *Mesogomphus cognatus*. ♂. M'Fongosi.
4. *Crenigomphus hartmanni*. ♂. M'Fongosi.
5. *Onychogomphus supinus*. ♂. Barberton.
6. *Ceratogomphus pictus*. ♀. Waterval.
7. *Gynacantha manderica*. ♂. Salisbury.
8. *Aeschna subpupillata*. ♂. Stutterheim.
9. *Anaciaeschna triangulifera*. ♀. Harrar.
10. *Macromia picta*. ♂. Durban.

PLATE IX.

FIG.

1. *Podogomphus praetorius*. ♂. M'Fongosi. Thoracic pattern, diagrammatic.
2. *Mesogomphus hageni*. ♂. Waterval. Thoracic pattern, diagrammatic.
3. „ *elpidius*. ♂. M'Fongosi. Thoracic pattern, diagrammatic.
4. „ *cognatus*. ♂. M'Fongosi. Thoracic pattern, diagrammatic.
5. *Crenigomphus hartmanni*. ♂. M'Fongosi. Thoracic pattern, diagrammatic.
6. *Onychogomphus supinus*. ♂. Barberton. Thoracic pattern, diagrammatic.
7. *Ceratogomphus pictus*. ♂. Waterval. Thoracic pattern, diagrammatic.

PLATE X.

FIG.

1. *Macromia picta*. ♀. Kranspoort.
2. *Macromia thetis*. ♀. Barberton.
3. „ *clymene*. ♂. Kapiri.
4. *Orthetrum stemmale capense*. ♂. M'Fongosi.
5. *Palpopleura lucia*. ♂. M'Fongosi.
6. „ „ ♀. Lorenzo Marques. Type form.
7. „ „ ♂. M'Fongosi. var. *portia*.
8. „ „ ♀. M'Fongosi. Form corresponding to ♂ *portia*.
9. „ *jucunda*. ♂. M'Fongosi.
10. „ „ ♀. M'Fongosi.
11. *Hemistigma albipuncta*. ♂. Lorenzo Marques.

PLATE XI.

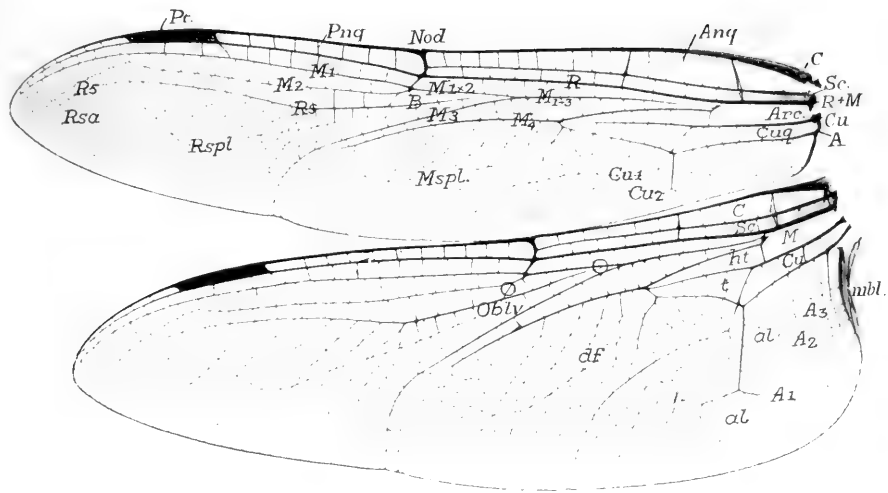
FIG.

1. *Hemistigma albipuncta*. ♀. Lorenzo Marques.
2. *Acisoma panorpoides ascalaphoides*. ♂. Lorenzo Marques.
3. *Crocothemis sanguinolenta*. ♂. M'Fongosi.
4. *Sympetrum fonscolombei*. ♂. Cape Town.
5. *Trithemis Distanti*. ♂. Dunbrody.
6. *Rhyothemis mariposa*. ♂. Otiembora.
7. „ *semihyalina*. ♂. Inhambane.
8. *Urothemis edwardsi*. ♀. Inhambane.

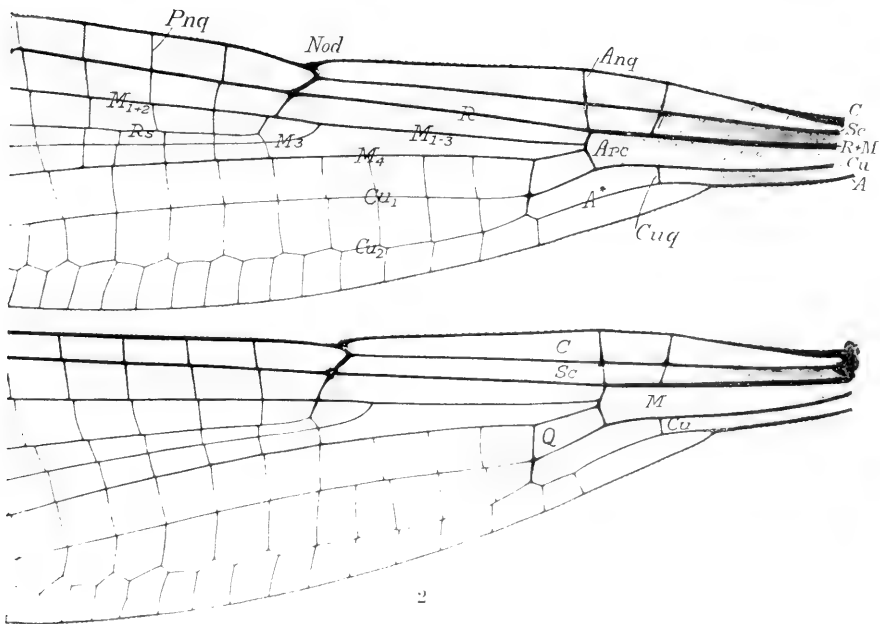
## PLATE XII.

FIG.

1. *Lestes virens*. Nymph (European).
2. *Platynemis pennipes*. Nymphs (European).
3. *Gomphus pulchellus*. Nymph (European).
4. *Anax imperator*. Nymph (European).
5. *Orthetrum cancellatum*. Nymph (European).
6. *Sympetrum striolatum*. Nymph (European).



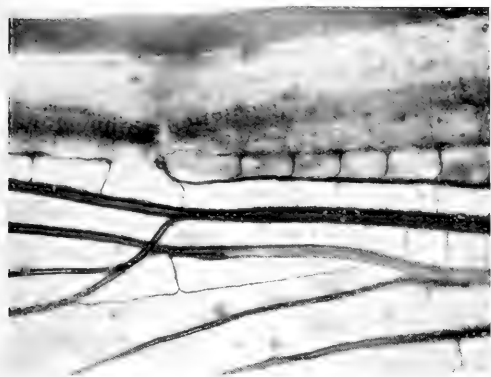
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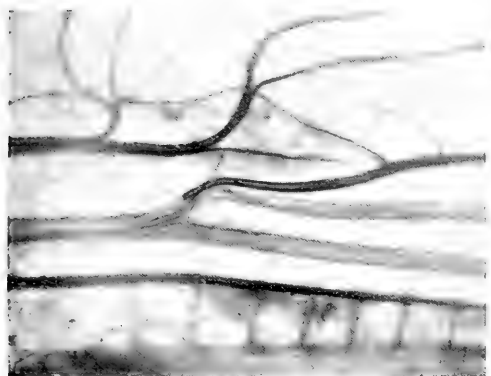




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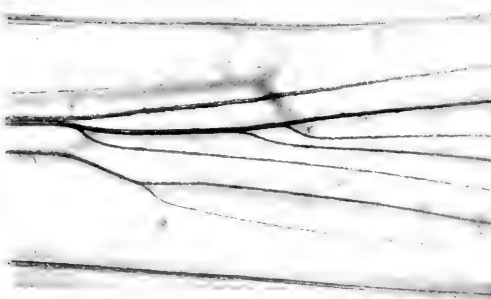
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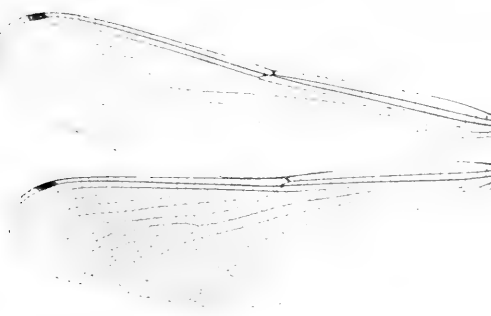
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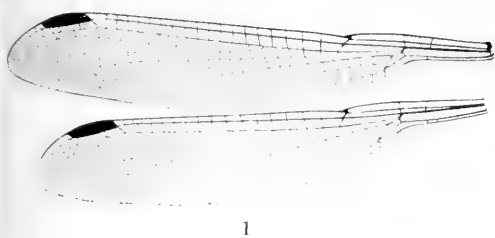
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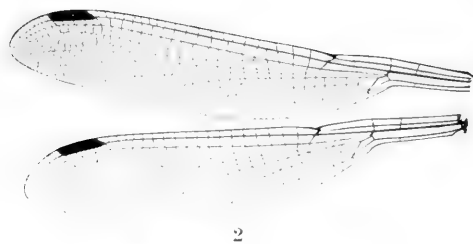
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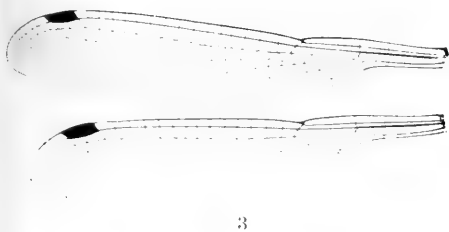




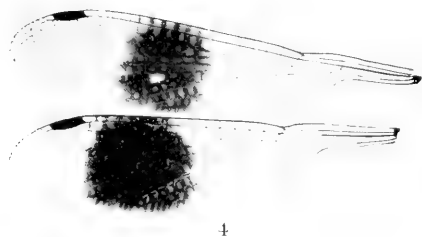
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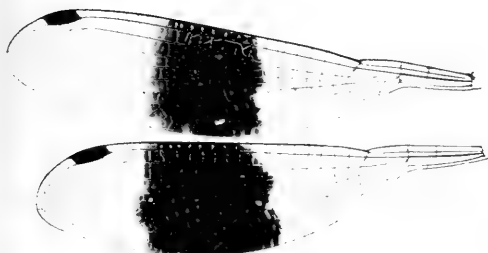
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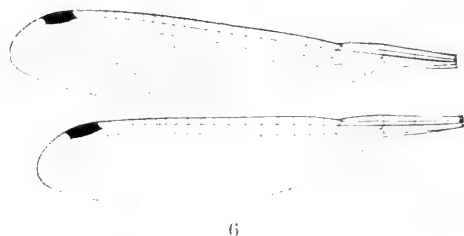
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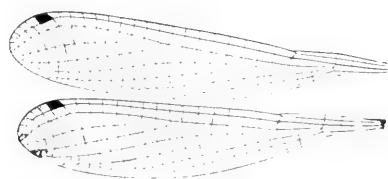
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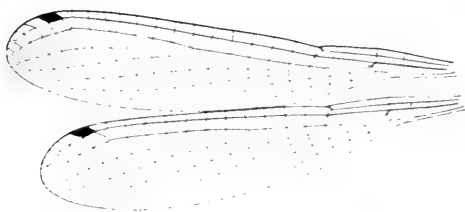
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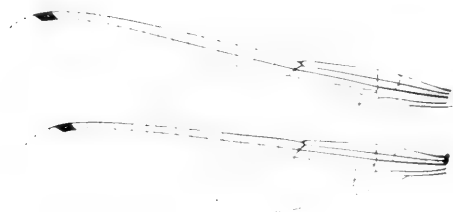
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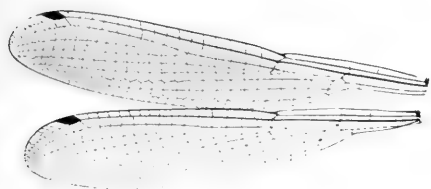


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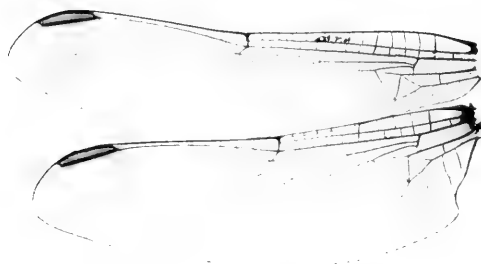
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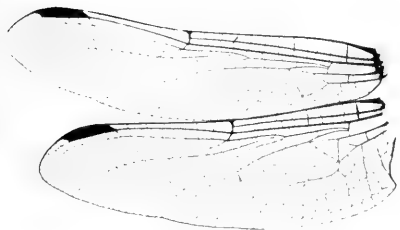




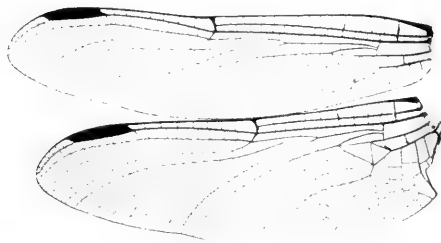
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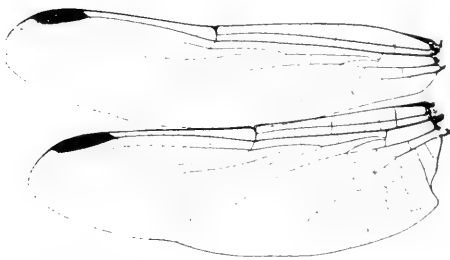
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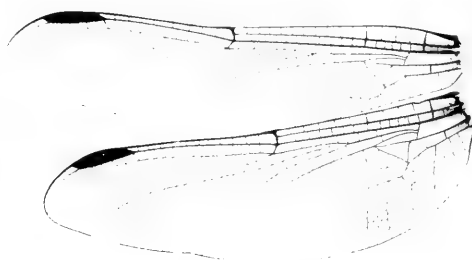
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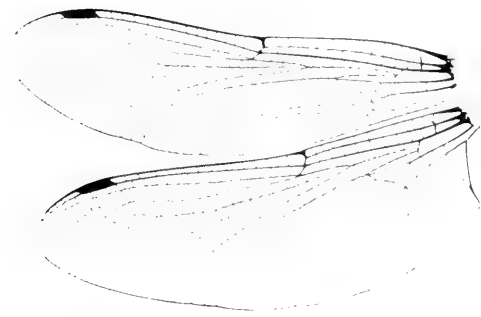
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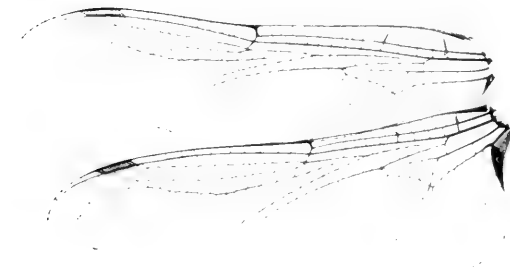
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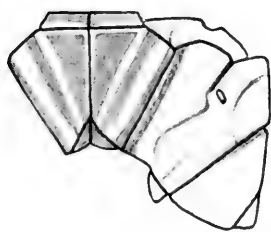
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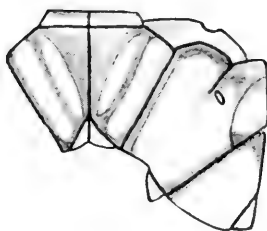
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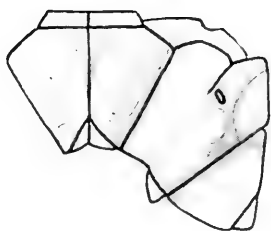




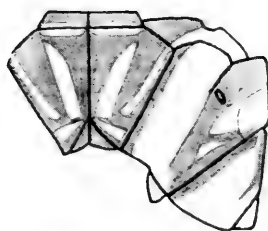
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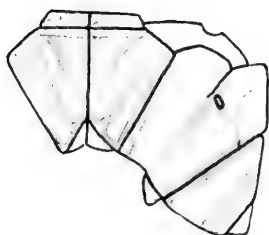
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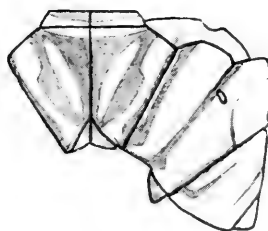
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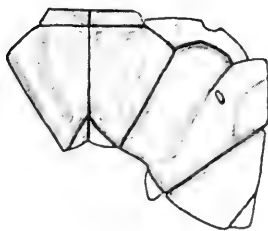
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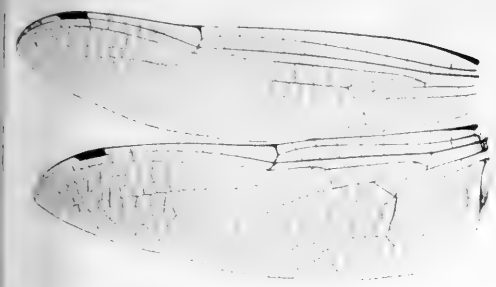
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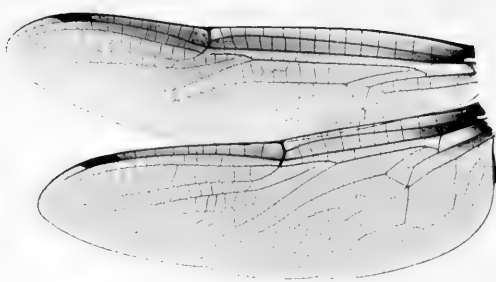
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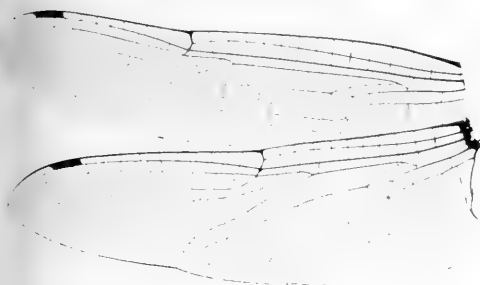




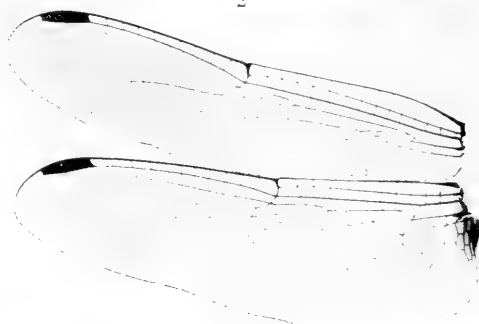
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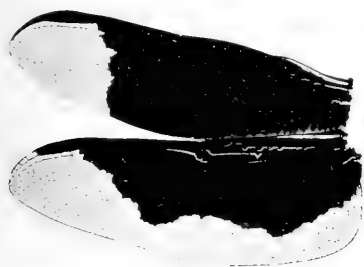
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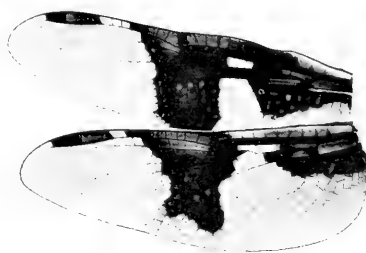
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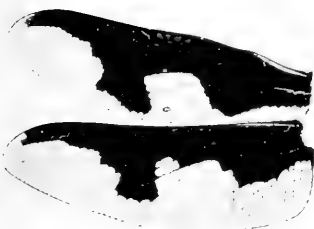
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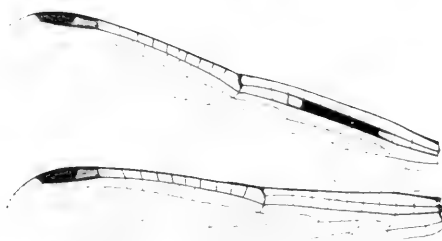
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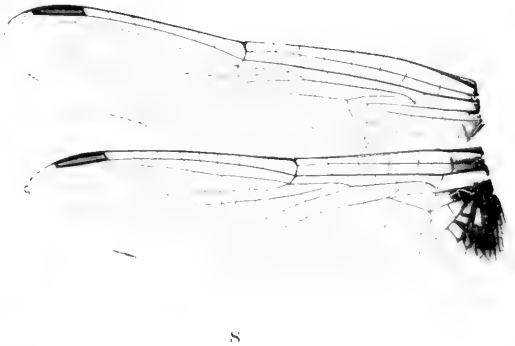
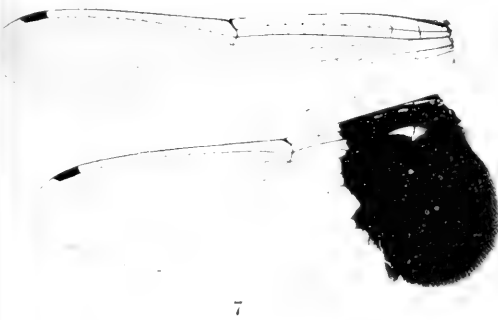
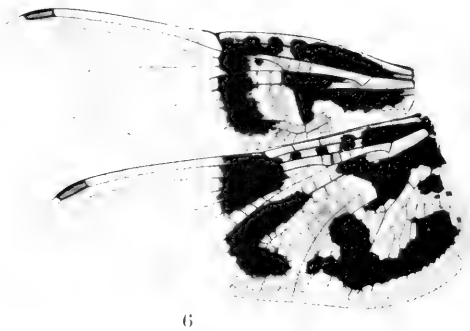
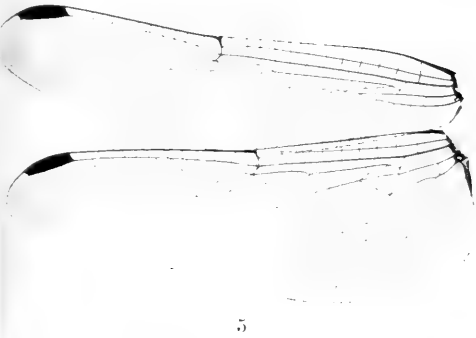
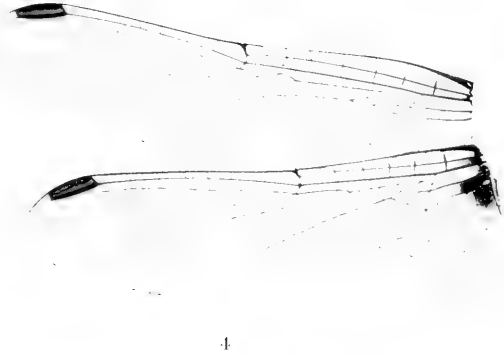
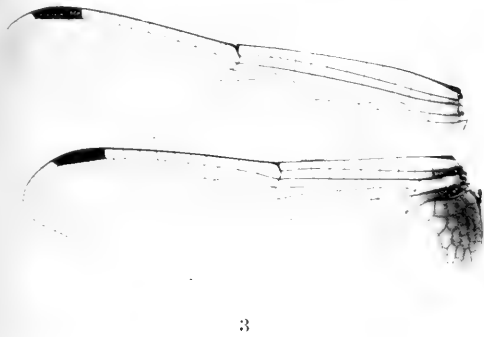
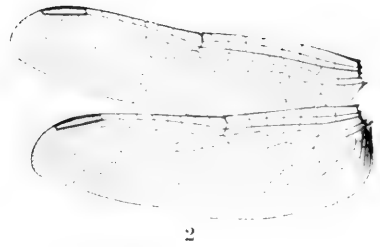
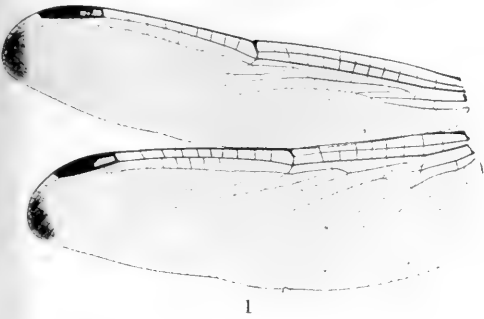


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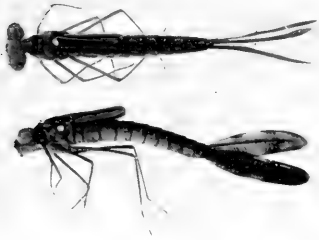




SOUTH AFRICAN ODONATA.



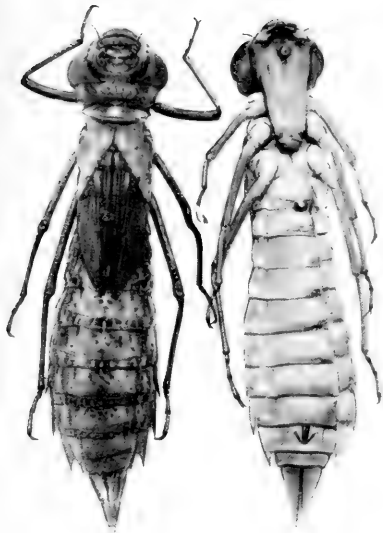




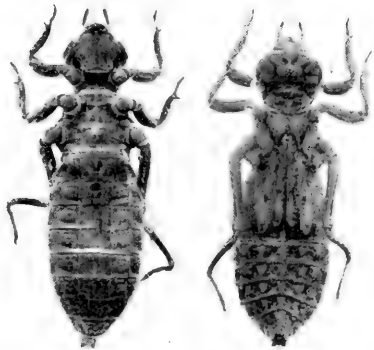
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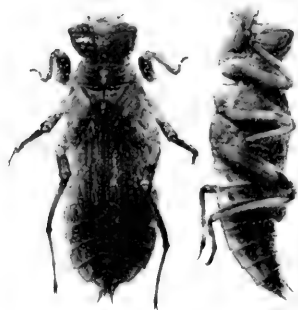
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SOUTH AFRICAN ODONATA.



- 6.—*South African Crustacea* (Part XI of S.A. Crustacea, for the Marine Investigations of South Africa).—By the Rev. THOMAS R. R. STEBBING, M.A., F.R.S., F.L.S., F.Z.S., Fellow of King's College, London, Hon. Memb. of New Zealand Inst., Hon. Fellow of Worcester College, Oxford.

(Plates XIII–XX of Vol. XVIII. Plates CVIII–CXV of Crustacea.)

THE fourteen species here considered are distributed over nine families. Six of the species are regarded as new, one of them seeming to require a new genus. The details supplied in the plates for *Eucrate affinis*, Haswell, and *Penaeus longicornis* (Olivier) may claim to be of scientific interest, although the specific names have been previously published. In the case of Olivier's species the name is a revival. Also under the heading of the genus *Ebalia* opportunity has been taken for rectifying some ancient misstatements in nomenclature. The name of the new genus *Maxillothrix* asks attention to the equipment of the vibratory lamina of the second maxilla, which often passes unnoticed, probably for two reasons, one being its usual uniformity, the other the difficulty of obtaining it undamaged in the manipulation of small Malacostraca.

## BRACHYURA.

### TRIBE OXYRRHYNCHA.

#### FAMILY INACHIDAE.

##### GEN. ACHAEOPSIS, Stimpson.

1857. *Achaeopsis*, Stimpson, Pr. Ac. Sci. Philad., vol. 9, p. 219.  
 1910. „ and *Dorynchus*, Stebbing, Ann. S. Afr. Mus., vol. 6,  
 p. 285.

ACHAEOPSIS SPINULOSUS, Stimpson, 1857.

(See these Annals, vol. 6, p. 285, and add—

1911. *Achaeopsis spinulosus*, Rathbun, Tr. Linn. Soc. London, ser. 2,  
 vol. 14, p. 247.)

Miss Rathbun notes that *A. spinulosus* has shorter legs than *A. thomsoni* (Norman), and that in the former "there is no indication in description or figure of the terminal spine on the merus joints." A female specimen laden with eggs agrees in these respects with *A. spinulosus*. Its mouth-organs are the same as those of *A. thomsoni*.

*Locality.* 34° 5' S.  $\frac{1}{2}$  S., 25° 43' E.; depth 52 fathoms. A 1437 and (juv. ?) Pt. Shepstone, W.N.W., 2 miles; depth 24 fathoms. A 1436.

## FAMILY BLASTIDAE.

### GEN. BLASTUS, Leach.

1814. *Blastus*, Leach, Edinb. Encycl., vol. 7, p. 431.

This generic name, with Pennant's *Cancer tetraodon* as type of the genus, has page precedence of *Pisa*.

### BLASTUS FASCICULARIS (Krauss).

1843. *Pisa fascicularis*, Krauss, Südafrik. Crust., p. 50, pl. 3, figs. 5, a-d.

1910. " " Stebbing, Ann. S. Afr. Mus., vol. 6, p. 288.

A male specimen of this little species was obtained by Mr. K. H. Barnard, "washed up on Durban beach." A 2251.

It differs from the description given by Krauss only in having the fingers of the chelipeds comparatively short. His figures of the large smooth hands leave this character indefinite. Krauss attributes the genus *Pisa* to de Haan instead of Leach, who regarded it as distinct from his own genus *Blastus*.

### GEN. EURYNOME, Leach, 1814.

(See these Annals, vol. 6, 1910, pp. 288, 289.)

### EURYNOME ELEGANS, n. sp.

#### Plate CVIII.

This graceful form, a female carrying numerous brown eggs, was unfortunately devoid of both chelipeds. Nevertheless it shows some sufficiently distinctive features. It is nearly allied to *Eurynome longimanus*, Stimpson, 1857, redescribed and rather obscurely figured in his posthumous work, edited by Miss Rathbun in 1907. The

proportion of breadth to length of carapace is there given as 1:1.38, no doubt including in the length the divergent horns. In our specimen the breadth is rather less than 7 mm., with a length, not including the horns, somewhat over 8 mm. The eyes are light orange, not black, as in Stimpson's species. In place of the five teeth on the branchial region there are here a convex row of five little nodules. The ambulatory limbs have each a thin blade-like carina on the fourth joint, not toothed as in Stimpson's species. This transparent carina differs much from the rugosity found in other species of the genus.

I have figured both mandibles to show that they are not absolutely alike, one having a projecting tooth, which is wanting in the other.

*Locality.* Cape Vidal, N.N.E.  $\frac{1}{4}$  N. 95 miles, Zululand; depth 80 fathoms, whence the specimen was obtained by s.s. "Pieter Faure." A 1610.

## FAMILY PARTHENOPIDAE.

GEN. PLATYLAMBRUS, Stimpson, 1871.

PLATYLAMBRUS QUEMVIS, Stebbing.

(See Ann. Durban Mus., vol. 2, pt. 1, p. 5, pl. 1; 1917.)

A specimen somewhat larger than that previously described has a wider trilobed pleon, presumably due to a more advanced age. It was taken in Natal waters, Tongaat River, N.W. by N.  $\frac{1}{4}$  N.  $5\frac{1}{2}$  miles; depth 30 fathoms. A 384.

## TRIBE CYCLOMETOPA.

### FAMILY XANTHIDAE.

GEN. ACTAEA, de Haan, 1833.

(See these Annals, vol. 6, pt. 4, p. 298; 1910.)

ACTAEA HIRSUTISSIMUS (Rüppell).

1830. *Xantho hirsutissimus*, Rüppell, 24 Krabben roth. Meeres, p. 26, pl. 5, fig. 6, pl. 6, fig. 21.

1833. *Cancer (Actaea) hirsutissimus*, de Haan, Crust. Japon., decas 1, p. 18.

1834. *Xantho hirtissimus*, M. Edwards, Hist. Nat. Crust., vol. 1, p. 389.  
 1898. *Actaea hirsutissima*, Alcock, J. Asiat. Soc. Bengal, vol. 67, pt. 2,  
 pp. 138, 141 (with synonymy).  
 1907. „ „ Rathbun, Mem. Mus. Comp. Zool., vol. 35,  
 p. 42.

Milne Edwards, no doubt accidentally, transposes his references to Rüppell's *hirsutissimus* and *asper*. Targioni Tozzetti, 1877, studies the genus elaborately under the name *Actea*.

Two specimens of this extremely hirsute species were obtained by Mr. Keppel Barnard at Mozambique. The carapace of the larger is 18 mm. broad and the fingers of the chelipeds are black. In the smaller specimen, with carapace about 9 mm. broad, the fingers of the chelipeds are quite pale. A 2207.

#### GEN. GALENE, de Haan.

1833. *Galene*, de Haan, Crust. Japon., decas 1, p. 19.  
 1852. „ Dana, U.S. Expl. Exp., vol. 13, pp. 229, 231.  
 1867. *Eurycarcinus*, A. M.-Edwards, Ann. Soc. Ent. France, ser. 4,  
 vol. 7, p. 276.  
 1910. „ Stebbing, Ann. S. Afr. Mus., vol. 6, p. 302.

#### GALENE NATALENSIS, Krauss, 1843.

Specimens which I refer to this species were obtained by Mr. Barnard at Delagoa Bay. No one of the authorities which I have been able to consult explains why *Galene* should be displaced by the much later *Eurycarcinus*. A 2117.

#### MAXILLOTHRIX, gen. nov.

Inter-orbital front undivided, obtuse-angled. Pleon of both sexes broad, telson much broader than long. Second antenna with rather long flagellum. Vibratory lamina of second maxilla carrying elongate setae. Fourth joint of second maxilliped long and tapering, sixth larger than either fifth or seventh. Third maxilliped having the broad fourth joint not much shorter than the third, with the fifth attached to its antero-interior angle, the sixth joint much smaller than either the fifth or seventh.

The generic name, a hybrid, from maxilla and  $\theta\rho\acute{\iota}\xi$ , refers, as above mentioned, to an unusual feature in the second maxillae.

## MAXILLOTHRIX ACTAEIFORMIS, n. sp.

## Plate CIX.

In general aspect approaching *Actaea hirsutissimus*, having its numerous tubercles surmounted by tufts of light-coloured, rather stout setae. The inter-orbital front is not notched, and when its contour is brought into view the lower margin of the orbit becomes visible, portions of both pairs of antennae are in view, and the terminal joints of the large third maxillipeds obtrude themselves, all together making a picture difficult to represent distinctly. The antero-lateral margins are divided into four lobules, followed by a very small one which withdraws to the slightly convex postero-lateral margin. In the male pleon the second segment is wider than the third, from which, contrary to custom, the pleon widens slightly to the broad telson. Of this the hind margin is bluntly triangular in the male, but rounded in the female, the whole pleon fringed with setae in both sexes. In both the segments between the second and sixth present obscure delimitation. The male appendage of the large specimen was unfortunately lost during manipulation, and that figured on a larger scale is from a smaller specimen.

The flagellum of the second antenna is as long as the peduncle. The eyes have pale orange corneae. In the second maxillae the vibratory lamina carries at the lower end three very unequal but all very long setae—a striking contrast to the species here assigned to *Nursia*, in which this apparatus has no setae at all, but reminiscent of the produced lower setae in *Rhynchocinetes typus* and of the long spine in *Axius longispina*, recently described in these Annals (vol. 17, pt. 4).<sup>\*</sup> The principal joints of the third maxillipeds in the largest specimen retained longitudinal stripes of orange and white. The lower border of hand and thumb in the chelipeds is white and polished, with a broad serrate apex overlapped by the obtuse-ended finger, the curvature of which leaves a gap between it and the thumb. The close matting of the palm above is in striking contrast with the smooth lower border. The ambulatory limbs are very hirsute, with the unguis small and curved. Carapace of largest male, 14 mm. broad, 12 mm. long; smaller male, 9 mm. broad, 7.5 mm. long.

<sup>\*</sup> In his 'Catal. Indian Decapod Const.,' 1901, pl. A, Alcock shows two long terminal setae on the second maxillae of his *Homola andamanicus*, but does not notice them in the text. In 1882 S. I. Smith had called attention to the remarkable length of the setae in question in a species of *Eumiersia* (*Nemato-carcinus*). Bate, 'Challenger Macrura,' p. 768, 1888, notes this as a character of his genus *Campylonotus*.

*Locality.* Umhlangakulu River, N.W. by N., 7 miles; depth 50 fathoms, Natal. A 839.

### TRIBE CATOMETOPA.

#### FAMILY GONEPLACIDAE.

GEN. EUCRATE, de Haan, 1835.

EUCRATE AFFINIS, Haswell.

Plate CX.

This species has recently been discussed in these Annals, vol. 17, p. 238, from a small and very imperfect specimen. The opportunity has now occurred of comparing better and larger specimens, one of each sex, the female having the carapace 15 mm. broad at the third antero-lateral tooth, with a length of 12 mm., the male carapace measuring 11 mm. in breadth with a length slightly over 8 mm. Some interesting differences may be observed between the second maxillae and third maxillipeds of this species and the corresponding parts of *Pachygrapsus polyodous*. Both the specimens of *Eucrate* were collected in Durban waters, the male coming from the Durban Museum, the female from the South African. A 3939.

#### FAMILY GRAPSIDAE.

(See these Annals, vol. 6, pt. 4, p. 316, and add—  
1918. *Grapsidae*, Rathbun, U.S. Nat. Mus., Bulletin No. 97, p. 224.)

GEN. PACHYGRAPSUS, Randall, 1839.

(See these Annals, vol. 6, p. 319, and add—  
*Pachygrapsus*, Rathbun, as above, p. 240.)

The new species requires a slight modification of the generic account given by Miss Rathbun, as that account admits only a maximum of three antero-lateral teeth on each side of the sub-quadrata carapace, while here there are distinctly four.

PACHYGRAPSUS POLYODOUS, n. sp.

Plate CXI.

The character just mentioned, though found in other Grapsoid genera, is apparently unique among the known species of *Pachy-*



*grapsus*. The carapace of the single specimen, a male, measures 22 mm. in breadth by 18 mm. in length. The finely-granulated, nearly straight frontal piece between the orbits is approximately half the total breadth of the front. It has a small median notch. The greatest breadth of the carapace is at the third antero-lateral tooth. The succeeding tooth is much the smallest. The telson is triangular, broader than long. The third maxillipeds, which stood far apart, have the fourth joint broader than long, much shorter than the third, and the sixth joint shorter than the fifth or the seventh. The chelipeds are notable for the strikingly dentate carinae of the fourth joint, to which allusion is made in the specific name, from the Greek πολυδους, many-toothed. The fingers, especially of the larger chela, have the confronting margins denticulate so as to close pretty closely together, both hands and fingers having various grooves and much granular ornamentation. The ambulatory limbs are closely alike in structure, except that the first and last are shorter than the two intermediate pairs. In all the fourth joint has a single distal tooth, the sixth has some short marginal spines and the seventh several marginal groups of stiff setae.

*Locality.* Umhlangakulu River, N.W. by N., 7 miles; depth 50 fathoms. A 851.

## TRIBE OXYSTOMATA.

(See these Annals, vol. 6, p. 333; 1910.)

## FAMILY LEUCOSIIDAE.

(See these Annals, vol. 6, p. 335; 1910.)

## GEN. EBALIA, Leach, 1817.

(See references above, p. 337, and add—

1837. *Ebalia*, M. Edwards, Hist. Nat. Crust., vol. 2, pl. 128.

1837. „ M. Edwards, Règne anim. Cuvier, explic. pl. 24.)

In the plate just mentioned Milne Edwards well exhibits the difference between the third maxillipeds of *Ebalia* and *Philyra*. But he calls one species *Ebalia brayerii*, Leach, thus misspelling *E. bryerii*, the name which Leach wrongfully substituted for the species called by Montagu *Cancer tumefactus*. There is an obvious confusion in the numbering of Montagu's figures. This, however, in no way justified Leach in supposing that Montagu had

confused his new species with *Cancer tuberosus*, Pennant, since Montagu is careful to explain why this confusion could not arise. The other species which Milne Edwards has usefully dealt with in the Atlas of the 'Règne animal' has likewise experienced some mystification in its specific name. Milne Edwards gives it as *Philyra globulosa*, Leach. Now if Herbst can be trusted Fabricius in the 'Syst. Ent.,' 1775, described a species as *Cancer globus*. At any rate he gives this name in the 'Species Insectorum,' vol. 1, p. 497, 1781. But in 'Ent. Syst.,' 1793, he changes the name to *Cancer globosus*, and wrongfully claims Herbst as having agreed in the change. In the 'Suppl. Ent. Syst.,' 1798, the name is further changed to *Leucosia globosa*, which Milne Edwards in 1837 erroneously quotes as *Leucosia globulosa* and proceeds to assign *Philyra globulosa* to Leach in place of *Philyra globosa* for which he was in fact responsible, whereas the correct name is *Philyra globus* (Fabricius). From this the following new species, though similar in general aspect, is generically separated by the third maxillipeds. The specific name is a Latin word signifying a ball of thread. In its own genus the species makes some approach to *Ebalia diadumena*, Alcock, 1876, but is distinguished from it by much greater size, deeper emargination of the front, median tooth of the hind margin of the carapace, fingers of the chelipeds as long as the palms.

Alcock, relying in part on de Man's researches, divides *Cancer globus* into two species, naming the female *Philyra globosa*, the male *Philyra globulosa*.

#### EBALIA GLOMUS, n. sp.

#### Plate CXII.

The specimens to which I give this name deserve it, more especially in the female sex, which roll about in an aggravating manner after they have shed their limbs, as they thoughtlessly do. Besides the difficulty which this instability causes in dissection of the delicate mouth-organs, it has an indirect effect in exhibiting the surface of this miniature globe so differently according to the angle of observation, that figures of two views might be supposed to represent two distinct species. The carapace of the female figured measured 8.5 mm. at the broadest part, with a median length about the same. The carapace of the male measured 6 mm. in breadth and the same in length. The

difference in globosity of the two sexes is chiefly due to the great breadth and convexity of the female pleon with its multitude of small eggs, while the male pleon is narrow and not inflated. In each sex the ventral surface of the body has a strip of tubercles on either side of the tightly folded pleon. In the female the segments 3 to 6 are consolidated, in the male only 3 to 5. In both the telson is very small, that of the female partially immersed in the preceding segment, in the male not so, but fringed with setules, and having ventrally at the base an opaque white crescent-shaped process, of which the attachment could not be determined as between the preceding segment and the telson.

The front of the carapace is emarginate. Then comes a deep depression between two eminences just behind the orbits. The carapace then widens, with a large tubercle near each margin, and further back has a median pair, to the rear of which in the actual middle is a very large tubercle flanked by less considerable prominences, and followed by another large tubercle midway between it and the hind margin. This forms a very obtuse angle marked by a small tooth, with similar teeth at each extremity. Most of the surface is diversified with granules, which are displayed according to the magnification employed or the particular incidence of the light.

The triangular fourth joint of the third maxillipeds is not very much shorter than the preceding joint, and the exopod, though broad, is not extravagantly widened. The fingers of the chelipeds are as long as the palms, and have minutely interlocking teeth towards the extremities of their confronting margins. The delicate long-fingered ambulatory limbs were present only on the male example.

*Locality.* Natal waters, Umhloti River, N.N.W.  $1\frac{1}{2}$  miles; depth 27 fathoms. A 503.

#### GEN. NURSIA, Leach, 1817.

(See these Annals, vol. 17, p. 246, 1920, and add—  
1915. *Nursia*, Balss, Decapoden rot. Meeres, vol. 31, pt. 2, p. 17.)

#### NURSIA POSTULANS, n. sp.

#### Plate CXIII.

Among several examples or varieties of the form already described as *Nursia scandens*, one specimen seems to claim specific distinction by the characters of the carapace and pleon. The front is slightly emarginate, the hind margin strongly bilobed, behind a large blunt

median tubercle. A little behind the centre of the carapace is a nearly straight transverse row of three tubercles, and in advance of these a pair. The margins are diversified by a concavity behind the orbits, followed by an oblique line, beyond which the carapace rather abruptly widens with a broad curve gradually sloping to the posterior lobes; the margin almost throughout finely granular or denticulate. The pleon has a narrowly triangular telson, fully twice as long as the small sixth segment, which has a roughened surface; the three preceding segments consolidated, but widening successively forward in a conspicuous manner. The character of the male appendage is shown in the figures. That which appears remarkable in this species and in *Nursia scandens* is that the vibratory lamina of the second maxilla is quite devoid of the customary fringe of setæ (notably developed in *Eumiersia ensifer*, S. I. Smith, see 'Bull. Mus. Comp. Zoöl.,' vol. 10, No. 1, p. 78, pl. 13, fig. 4, 1882, and in *Microprosthema crassimanus*, Richters, see Balss, 'Dec. rot. Meeres,' p. 34, fig. 27, 1915). Like the first and second maxillipeds this maxilla is remarkably delicate, and the specific name is an appeal for further light on these organs in other members of the family. Characters of the carapace make me doubtful as to whether I am justified in allotting the species here described to the genus *Nursia*.

*Locality.* Cape Natal, W. by N.  $\frac{3}{4}$  N. 11 miles; depth 184 fathoms. A 502.

## BRACHYURA ANOMALA.

### FAMILY DROMIIDAE.

#### GEN. EUDROMIA, Henderson.

(See these Annals, vol. 17, p. 253; 1920.)

#### EUDROMIA HENDERSONI, n. sp.

#### Plate CXIV.

The new species, named after Prof. J. R. Henderson, who instituted the genus, is distinguished from the type species, *E. frontalis*, by the character of the front, by the absence of the "prominent blunt spine" from the lateral borders, by the comparative robustness of the chelipeds with differing details, and by differences in the small fourth

and fifth peraeopods, so far as can be judged from the figures in the "Challenger" report. In our specimen the two lobes of the well-produced front are contiguous instead of presenting a deep concavity, nor is there anything corresponding to the lobe on either side "directed almost vertically upwards." The pleon of the female is devoid of the overlapping lateral processes found in *E. frontalis*. On the other hand, there are many points of agreement with that species: the produced front, making the length of the carapace greater than the breadth, the sulci of the female meeting in a tubercle between the bases of the chelipeds, the scarcely projecting eyes (of which the figure shows the peculiar shape and feeble cornea), the large first antennae, and the character of the nearly similar second and third peraeopods contrasted with the dwarf-fingered two following pairs. The carapace shows strong depressions postero-laterally for the reception of the hinder peraeopods. Its greatest breadth is 12 mm., with median length 13 mm.

*Locality.* Seal Island, N.W.  $\frac{1}{2}$  W. 7 miles; depth 19 fathoms. A 813.

## MACRURA.

### TRIBE PENAEIDEA.

#### FAMILY PENAEIDAE.

#### GEN. PENAEUS, J. C. Fabricius.

#### PENAEUS LONGICORNIS (Olivier).

#### Plate CXV.

1825. *Palaemon longicornis*, Olivier, Encyl. Méth., vol. 10, p. 662

[M. Edwards].

1837. *Penaeus indicus*, M. Edwards, Hist. Nat. Crust., vol. 2, p. 415.

This species has been already discussed in the 'Annals of the Durban Museum,' vol. 1, pt. 5, p. 443, under the heading of *P. indicus* var. *longirostris*, de Man. It now seems to me that de Man's *longirostris* is the original *P. indicus*, as shown by the resemblance to Olivier's *longicornis* which Milne Edwards specifies. As in that case the varietal name must be dropped, the acceptance

of Olivier's specific name will not be unreasonable. It anticipates *indicus* by several years.

The male specimen of which the petasma is figured has six ventral spines on the rostrum; the total length of the specimen is a little under 4 in., the carapace with rostrum measuring 50 mm., the sharply carinate sixth pleon segment 15 mm. and the sulcate telson 14 mm. The somewhat larger female specimen, from which all the other figures are drawn to a uniform scale of magnification, has only five ventral spines on the rostrum. The greater prolongation of the rostrum in young as compared with older specimens may be correlated with some requisite of defence which ceases with increasing size and strength.

*Locality.* Cape Point, N.E. by E. 36 miles; depth 650 fathoms, green mud. A 209.

The species is also recorded from "Umgeni River," 207, and from "Umgeni Lagoon," Durban, taken by T. L. Ruston. AG 1087.

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## EXPLANATION OF PLATES.

## PLATE XIII. (Crustacea, Plate CVIII.)

*Eurynome elegans*, n. sp.

- n.s. Lines indicating natural size of carapace figured above (breadth a little exaggerated) with ambulatory limbs on the right.  
 Pl., oc., a.i., plp. Pleon of the female and one of the pleopods, eye and second antenna seen from the ventral surface, and of uniform magnification. The remaining figures on a higher scale.  
 m., m., mxp. 2, mxp. 3, prp. 4, prp. 5. The two mandibles, second and third maxillipeds, fourth and fifth peraeopods.

## PLATE XIV. (Crustacea, Plate CIX.)

*Maxillothrix actaeiformis*, n. g. et sp.

- n.s. ♂. Lines indicating natural size of adjoining carapace; a male.  
 Pl. ♂, Pl. ♀, plp. ♂. Pleon of male, with male appendage of a smaller specimen. Pleon of female, like that of the male somewhat flattened.  
 oc., a.s., a.i. Eye, first and second antennae, from the larger male.  
 m., mx. 2, mxp. 2, mxp. 3. Mandible, second maxilla, second and third maxillipeds, from larger male.  
 prp. 1, prp. 4. First peraeopod (left cheliped), terminal portion of fourth peraeopod, both from larger male.

## PLATE XV. (Crustacea, Plate CX.)

*Eucrate affinis*, Haswell.

- n.s. ♀, n.s. ♂. Lines indicating natural size of carapace of the female and male specimens, of which parts are figured, all referring to the female except the pleon of the male.  
 car. Part of the carapace, with one of the peraeopods.  
 Pl. ♀. Pleon of female in dorsal view.  
 prp. 1, prp. 1, prp. 5. Hand and finger of smaller cheliped, and the larger below, and part of the fifth peraeopod. All the foregoing figures to a uniform scale; the mouth-organs more highly magnified.  
 m., mx. 2, mxp. 1, 2, 3. A mandible, second maxilla, first, second and third maxillipeds, the second very incomplete.  
 Pl. ♂. Pleon of male, more highly magnified than that of the female.



PLATE XVI. (Crustacea, Plate CXI.)

*Pachygrapsus polyodous*, n. sp.

- n.s. Dorsal view of carapace with one peraeopod attached, of the natural size.
- prp. prp. x. The smaller cheliped and a detached ambulatory limb of the natural size. The other figures are magnified to a uniform scale.
- car. Part of carapace, showing half of interorbital front, eye, and antero-lateral teeth.
- T. The telson, with part of preceding segment.
- a.s., m., m. First antenna; the mandibles, figure on left showing the inner or upper side, that on right the outer or lower side of the other mandible.
- mx. 2, mxp. 3, prp. 1. Second maxilla and third maxilliped; fingers of larger cheliped on left, on right fourth joint and fingers of the other cheliped.
- prp., x. Terminal part of detached limb much enlarged.

PLATE XVII. (Crustacea, Plate CXII.)

*Ebalia glomus*, n. sp.

- n.s. ♀, n.s. ♂. Lines indicating natural size of carapace, female above.
- Pl. ♀, Pl. ♂. Pleon of female in dorsal aspect, of male in ventral view.
- prp. 1 ♀, prp. 1 ♂. Chelipeds of female and male. All the above figures to a uniform scale.
- mxp. 3 ♀, plp. ♂. Third maxilliped of female, pleopod of male to higher scale.

PLATE XVIIIa. (Crustacea, Plate CXIIIa.).

*Nursia postulans*, n. sp.

- n.s. Lines indicating natural size of carapace.
- car., prp. 3, prp. 4. Dorsal view of carapace, with third and fourth peraeopods.
- Pl. Pleon more highly magnified, with male appendages below, one of them still more enlarged, showing shape when flattened.
- m., m., mx. 2, mxp. 1, 2, 3. The two mandibles, second maxilla, and the three maxillipeds all uniform in scale with the more enlarged male appendage.

PLATE XVIII<sub>B</sub>. (Crustacea, Plate CXIII<sub>B</sub>.)*Nursia scandens*, Stebbing.

n.s. Lines indicating natural size of carapace.

Pl. Pleon of female.

mx. 1, mx. 2. First and second maxillae, more highly magnified.

prp. 1. Left cheliped, uniform in scale with the pleon.

## PLATE XIX. (Crustacea, Plate CXIV.)

*Eudromia hendersoni*, n. sp.

n.s. Lines indicating natural size of the female carapace.

car. Carapace with projecting chelipeds and fifth peraeopod in position.

Pl. Dorsal view of pleon detached and flattened.

oc., a.s. Eye and first antenna, magnified in uniformity with the mouth organs.

m., mx. 1, mx. 2, mxp. 1, 2, 3. Mandible, first maxilla, second maxilla (incomplete), the three maxillipeds (lobes of the second detached).

prp. 1, prp. 5. A cheliped and fifth peraeopod.

## PLATE XX. (Crustacea, Plate CXV.)

*Penaeus longicornis* (Olivier).

r. Rostrum with part of carapace magnified.

T. Telson in dorsal view.

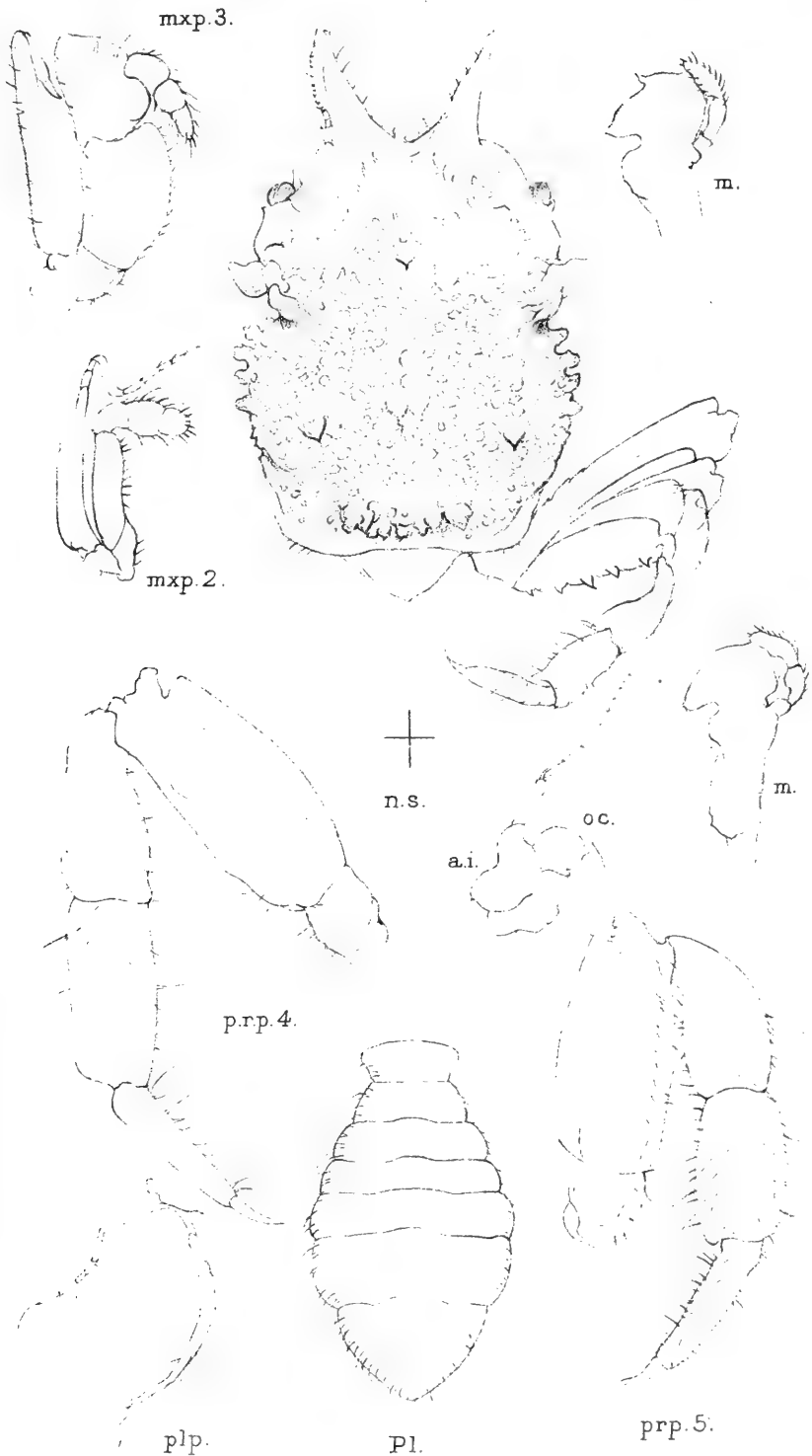
oc., a.s. Eye and first antenna.

m., mxp. 2, mxp. 3. Mandible, second and third maxillipeds.

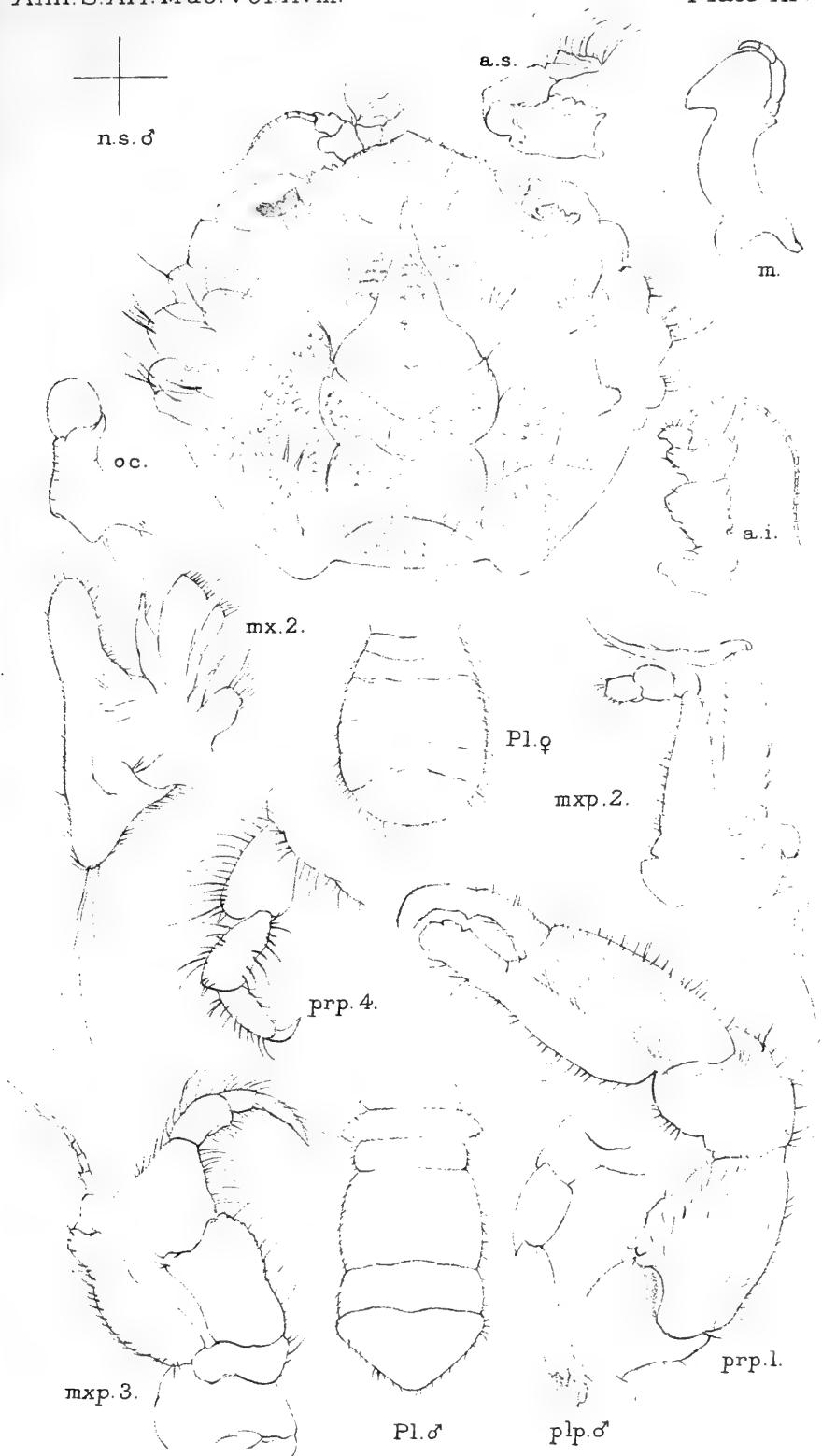
prp. 3. Third peraeopod.

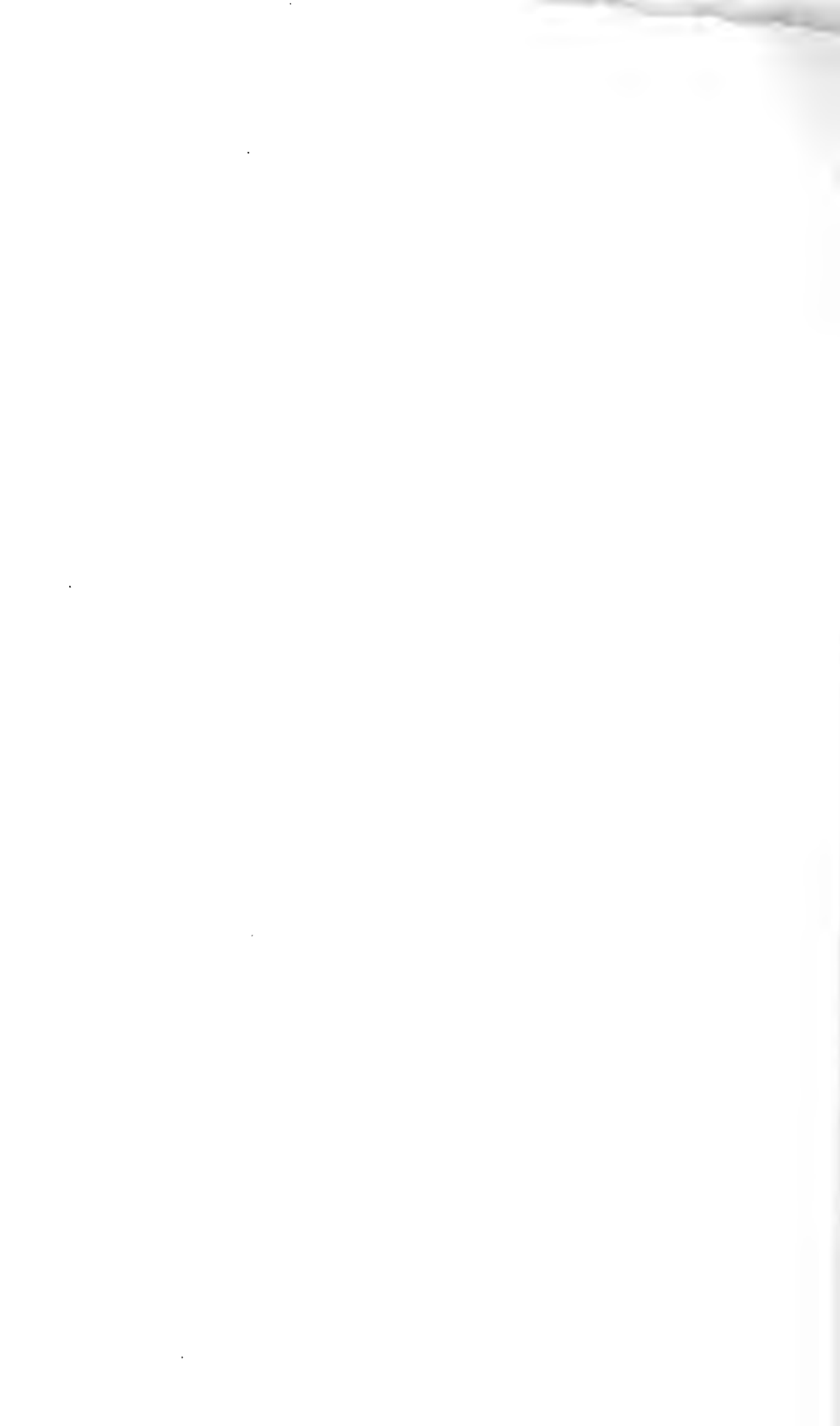
th. Thelycum of female.

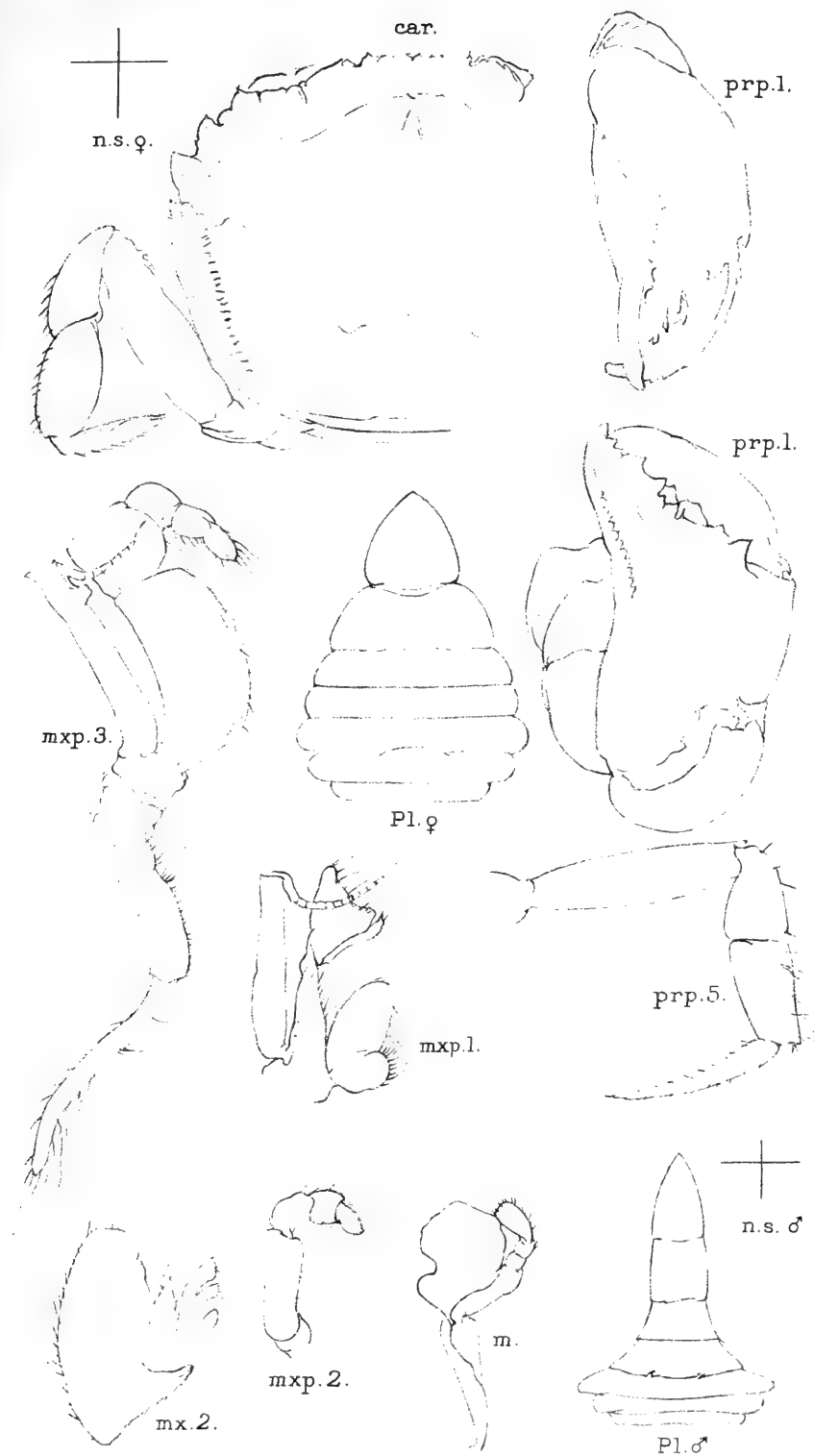
pet. Petasma of male in lateral view and flattened out.









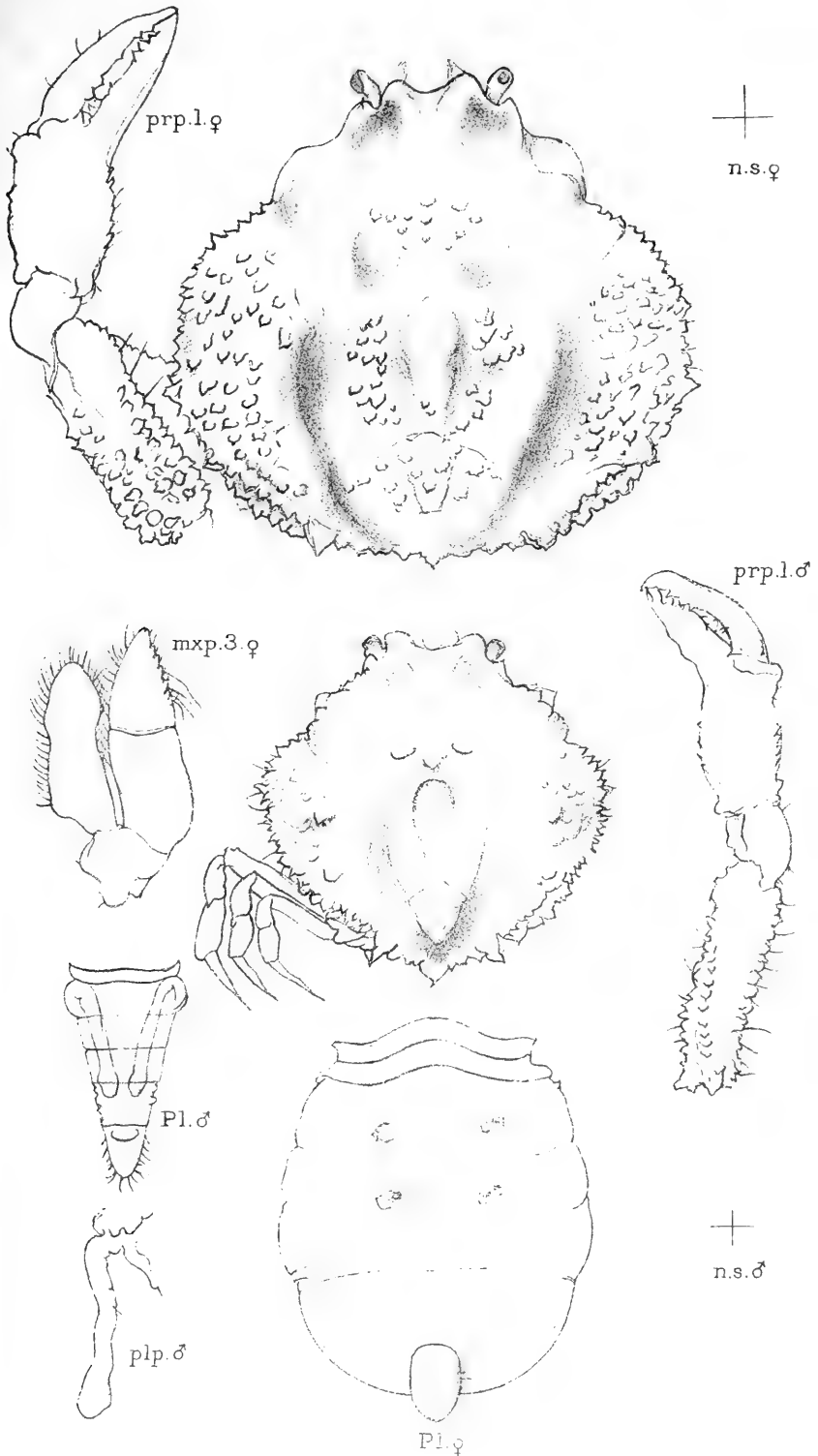






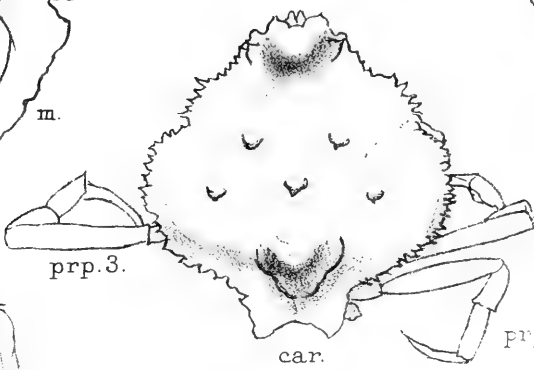
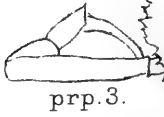








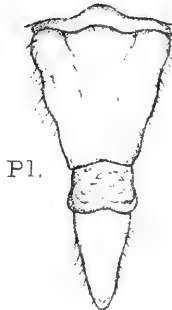
A.



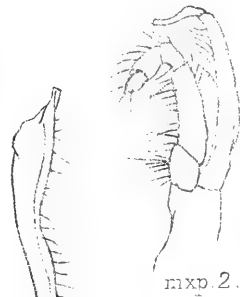
prp.4.



mxp.1.



Pl.



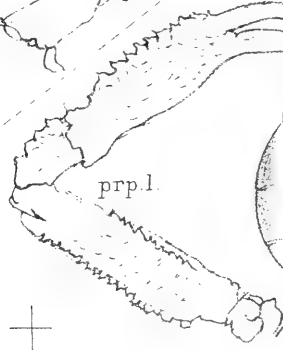
mxp.2.



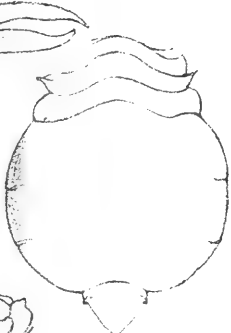
mxp.3.



mx.2.



prp.1.



Pl.



mx.2.



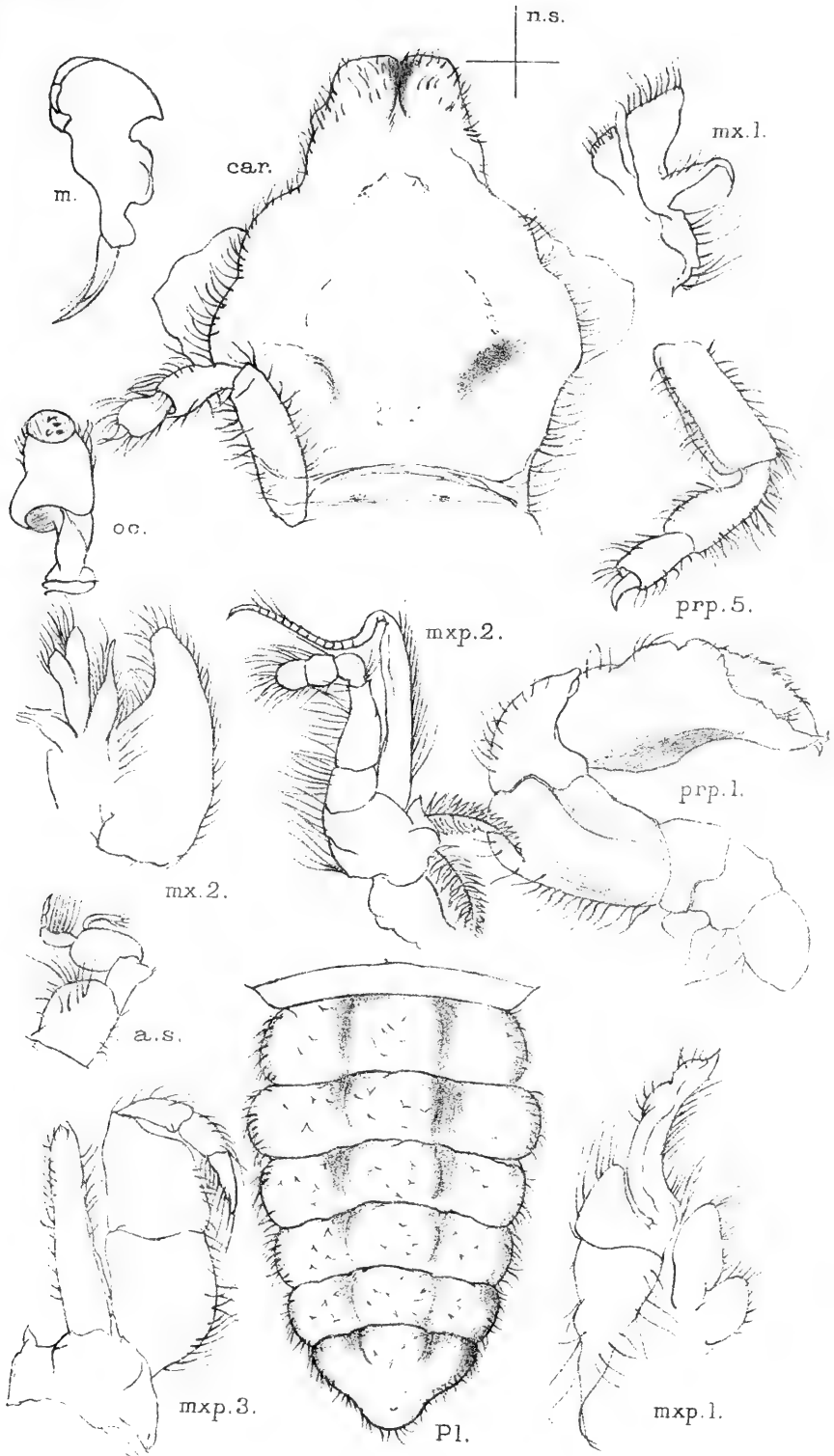
mx.1.

B.



n.s.

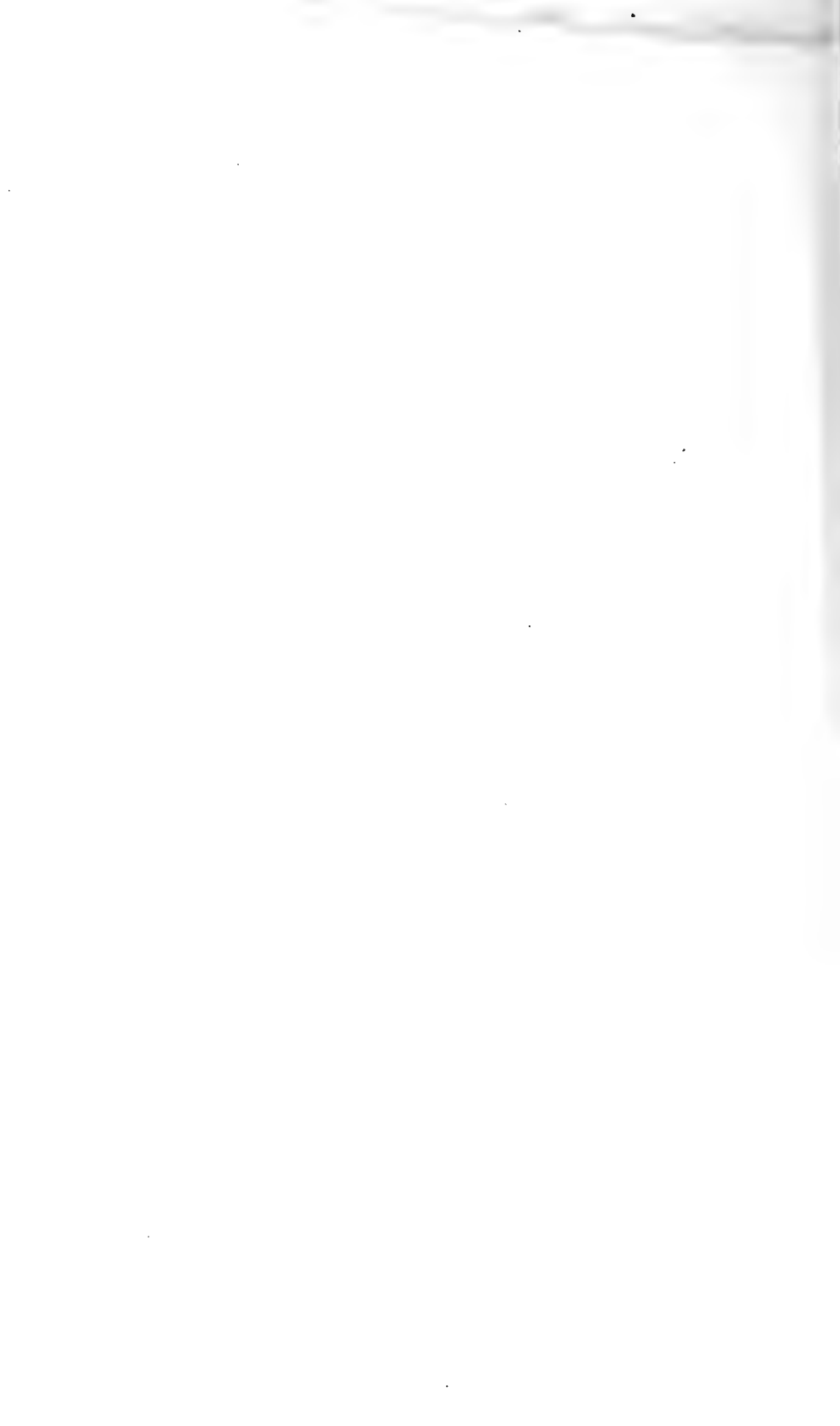




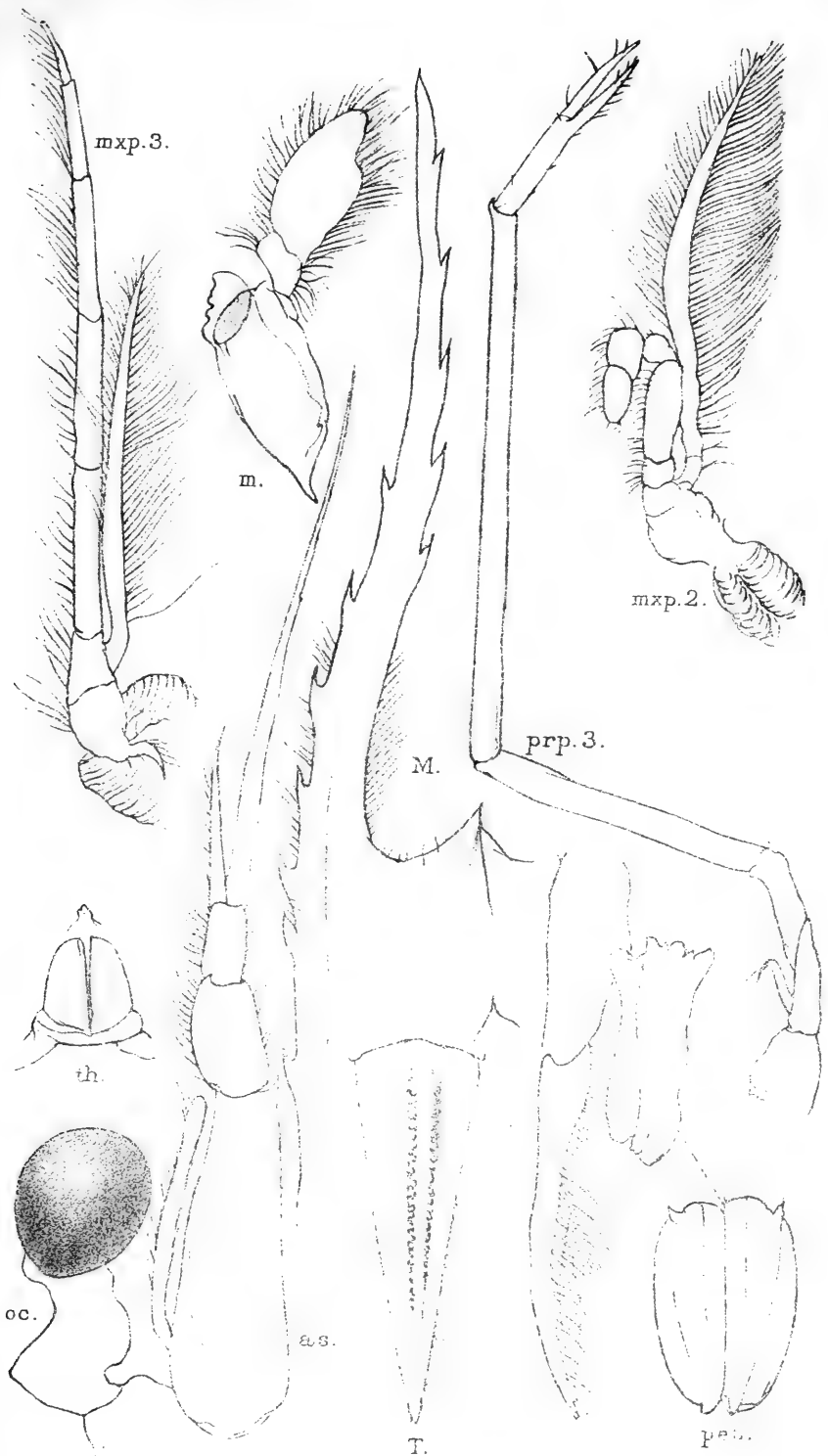
Del. T.R.R. Stebbing.

Adlard &amp; Son &amp; West Newman Ltd lith

EUDROMIA HENDERSONI, n.sp.







Del. T.R.R. Stebbing.

Adlard &amp; Son &amp; West Newman Ltd. lith.

PENÆUS LONGICORNIS (Olivier).



7.—*Additions to the Bombyliid Fauna of South Africa (Diptera), as represented in the South African Museum.*—By Prof. M. BEZZI.

THE Director of the South African Museum has sent me a small number of Bombyliidae from South-West Africa, obtained after the publication, on February 21st, 1921, of my memoir. These are now described. I have also added a few others, sent me by Dr. H. Brauns, that do not figure in my first list. Some of these will be more fully described in my forthcoming paper on the African Bombyliidae belonging to the Hungarian Museum at Budapest.

## BOMBYLIIDAE.

### BOMBYLIUS, Linn.

#### BOMBYLIUS PLAGIATUS, n. sp.

Closely allied to *B. acroleucus*, Bezzi, and belonging to the same group, but at once distinguishable by the more slender third antennal joint and by the wings having the discal cross-vein placed much beyond the middle of the discoidal cell, and having moreover a broad fuscous patch ending in a truncate form at the discal cross-vein.

Type ♀, one specimen from Delarey (W. Transvaal), January, 1917 (Dr. H. Brauns).

Length of body 9 mm.; of wing 10 mm.

Head and appendages exactly as in *B. acroleucus*; the third joint of the antennae is distinctly more slender at its broadest portion and not broader than the second joint. Thorax as in *B. acroleucus*, likewise with three equal longitudinal stripes of black hairs on the back; bristles entirely black. Scutellum, halteres and squamae as in *B. acroleucus*; abdomen of a like pattern, consisting of two broad round white spots on the sides of second and third segment and a smaller one in the middle; the terminal segments have the median spots more developed, being thus almost entirely white; the terminal bristles are black at base and white at end. Legs as in *B. acroleucus*; the wings have the same nervation, but are longer, and therefore the discoidal cell is elongate and the second and third posterior cells shorter; the discal cross-vein is placed on the terminal third of the discoidal cell. There is, moreover, a well-developed pattern, the extreme base to the basal cross-veins being black as in *B. acroleucus*; following is a yellowish patch extending from the costa to the whole of the second basal cell and filling up the whole of the costal cells; then a broad

fuscous patch of rectangular shape, extending from the face of the second longitudinal vein to the discal cross-vein and ending there in a straight line; this fuscous patch extends below a little into the upper part of the discoidal cell and into the apical part of the second basal cell and also along the fifth longitudinal vein.

### SOSIOMYA, Bezzi.

Ann. S. Afr. Mus., 8, 1921, p. 67.

### ADELIDEA (SOBARUS) AND SOSIOMYA.

It seems that the species of this peculiar South African group are more numerous than was at present believed. There can be no doubt that *Adelidea fuscipennis*, Macquart, is the same insect as *Sobarus anomalus*, Wiedemann and Loew, and even as *Cyllenia longirostris*, Wiedemann; all three are one species. I have seen, however, two other species which are certainly different, and therefore I will give the following key for all the known species.

- 1 (2). Third antennal joint beset with long bristles above; antennae entirely black; femora black; tibiae with partly black spicules; wings with a rounded fuscous spot at end of the anal cell . . . *comata*, Bezzi, 1921.

### ADELIDEA, Macq.

Bezzi, *loc. cit.*, p. 3.

- 2 (1). Third antennal joint quite bare above; legs entirely reddish with quite reddish spicules; no fuscous spot at end of anal cell.
- 3 (4). Basal joints of the antennae red; wings with the anterior half yellowish and with fuscous spots on cross-veins . . . *ruficornis*, n. sp.
- 4 (3). Antennae entirely black; wings with the anterior half infuscated or entirely fuscous.
- 5 (6). Wings with the anterior half infuscated and with fuscous spots on cross-veins; discoidal cell much longer than the second posterior cell. . . *anomala*, Wied.\*
- 6 (5). Wings equally and intensively infuscated, not spotted; discoidal cell only a little longer than the second posterior cell . . . *braunsi*, n. sp.

### ADELIDEA RUFICORNIS, n. sp.

Closely allied to *A. anomala* and possibly the unknown female of this species, but distinguished by the red basal joints of the antennae and by the not infuscated fore half of wings.

\* Of this species I have seen only a rather old male specimen in the British Museum.

One female specimen from Willowmore (Cape), November, 1920 (Dr. H. Brauns).

♀. Length of body and wing 8 mm.

Head yellowish, clothed with greyish tomentum, which is darker on the occiput; ocellar tubercle blackish; frons about as broad as one eye, clothed with short pale yellowish hairs, and having 4-5 long yellowish bristles on each side; face with short whitish hairs, and with a long mystax of yellowish, bristle-like hairs at mouth border; peristome narrow and whitish; beard white; upper occipital hairs yellowish. Antennae with the 2 basal joints red; the first joint is slender and long, about three times as long as the second joint, clothed above with short and below with long yellowish hairs; third joint black, slender, more slender than the first, as long as the 2 first joints together, with a short, hair-like terminal style. Palpi blackish, short; proboscis black, 4 mm. long. Thorax black, clothed with golden tomentum on the back, and with whitish tomentum on the pleurae; humeri and notapleural region reddish; a short stripe of white hairs on the sides above the root of the wings; lateral bristles long, strong, rather numerous, of a reddish colour, but the postalar ones are in part blackish; mesopleura with long white hairs and with a row of yellowish bristles at the hind border; sternopleura with short white hairs; metapleura bare. Scutellum entirely black, clothed with golden tomentum, and having 2-3 rows of long blackish bristles at the hind border. Squamae and halteres whitish, the former with white fringe. Abdomen black, densely clothed with golden tomentum, the last segments reddish at hind border; the hairs are short, scarce and yellowish, but all the segments except the first have a row of erect blackish bristles at the hind border. Venter reddish, clothed with whitish tomentum and white hairs, which are denser towards the sides, forming a white longitudinal stripe on each side. Legs quite reddish, the last tarsal joint only black at end; coxae white tomentose, and white pilose; all the bristles of the femora and the spicules of tibiae are reddish or yellowish, the hind femora having a row of 4-5 below near the end, and another row of 2-3 on the outer side at end. Claws black and thin, little curved; pulvilli whitish and shorter than the claws. Wings yellowish at base and on middle of fore border, grey on the remainder; the dark spots are on the praefurca, on the discal cross-vein (the largest of all), on base of cubital fork and on the apical cross-vein of the second basal cell; 2 less developed spots are on the apical cross-vein of the discoidal cell and on the external inner angle of the third posterior cell; there is no trace of fuscous spot at end of the anal cell. Venation as in *A. anomala*, with the

discoidal cell much longer than the second posterior cell; discal cross-vein on the last third of the discoidal cell; first posterior cell narrowed at end, about as broad as the anal cell at end. Basal hook yellowish; basal comb small and clothed with yellowish hairs; alula rounded, yellowish, not fringed. Veins reddish at base, blackened at end.

ADELIDEA BRAUNSI, n. sp.

A small species, at once distinguished by the equally infuscated, not spotted wings, which have, moreover, a short discoidal cell.

Two ♀ specimens from Willowmore (Cape), April, 1920 (collected by Dr. H. Brauns, in whose honour the species is named).

The present species cannot be the *A. fuscipennis* of Macquart as one may conclude from the name, the wings being described as yellowish at base and dark spotted.

♀. Length of body 4-4.5 mm.; of wing 5-6 mm. Head black, densely clothed with dark grey dust; occiput with dense yellowish hairs; frons broader than one eye, with short black bristles on the sides. Antennae quite black, the first joint with scarce black hairs; third joint as long as the 2 first joints together, with a short black terminal style. Face rounded, convex, blackish brown, with short blackish hairs at sides and at mouth border. Palpi black, long; proboscis black, 3-3.5 mm. long; beard scarce and yellowish. Thorax entirely black, with reddish humeri; on the back it is clothed with yellowish tomentum, and has numerous yellowish bristles at sides, the supra-alar ones being darker; on the pleurae the tomentum is more grey, and there are yellowish hairs only on the meso- and sternopleura, the rest being bare. Squamae blackish, with scarce yellowish fringe; halteres whitish. Scutellum entirely black and rather shiny, clothed, like the back of the mesonotum, with several rows of blackish bristles at hind border. Abdomen entirely black, rather shiny and yellowish tomentose; first segment with dense white hairs at sides; a row of blackish thin bristles at hind border of the segments. Venter entirely black, yellowish tomentose, clothed with dark hairs. Legs reddish, with black coxae and black tarsi except at base; the femora are blackened near the base; all the bristles and spicules reddish or yellowish; hind femora below without bristles, but with a row of 5-6 at the outer side near the end. Claws reddish, with black tips; pulvilli short, yellowish. Wings equally and rather intensely infuscated, almost blackish, without darker spots on cross-veins, but with a broad whitish praediscoidal spot, which is very striking against the infuscation. Basal comb not distinct, alula rounded, blackish, without fringe. Venation as in two preceding species, but the first posterior

cell not narrowed at end, the discal cross-vein placed near the middle of the discoidal cell, this last cell not much longer than the second posterior cell, anal cell very broadly open. All the veins are black, except the first, which is yellowish.\*

## USIINAE.

### CORSOMYZA, Wied.

#### CORSOMYZA SIMPLEX, Wiedemann, 1820.

A couple of specimens from Willowmore (Cape), September, 1920, Dr. H. Brauns. The female greatly resembles my *Megapalpus fulviceps* and may even be the same.

### HYPERUSIA, Bezzi.

#### HYPERUSIA MINOR, Bezzi.

Ann. S. Afr. Mus., xviii, p. 84.

In the male specimen the anal cell is closed and shortly stalked, while in the female the same cell is broadly open. This makes the distinction of *H. soror*, Bezzi, 1921, very doubtful. Mafa (Ovambo Land), February, 1921 (K. H. Barnard).

## PHTHIRIINAE.

### GONARTHURUS, Bezzi.

Ann. S. Afr. Mus., xviii, p. 88.

#### GONARTHURUS CHIONEUS, Bezzi.

One specimen from Willowmore (Cape), Dr. H. Brauns.

*Note.*—In my paper, *loc cit.*, p. 4, in the key of genera the name *Pseudoamictus*, Big., is used, while on p. 94 I employed the name *Pseudempis*. The two names are synonyms, and that of Bigot must be used because it is a valid one (even if not described), its type-species having been indicated.

\* The above described species have nothing to do with the recently erected genus *Conophorina*, Becker, 'Entom. Mitteil.', ix, 1920, pp. 181-184, figs. 1-3, the type species of which, *C. bicellaris*, Becker, was likewise collected near Willowmore (Cape), by Dr. H. Brauns; it has an incrassated first antennal joint and only 2 submarginal cells on the wings.

## TOMOMYZA, Wied.

## TOMOMYZA PICTIPENNIS, Bezzi, n. sp.

A very distinct species, resembling a small specimen of *Henica*, but belonging to the gen. *Tomomyza* in its true sense, as indicated in my key of the genera ('Ann. S. Afr. Mus.,' xviii, p. 5). The Mediterranean species, attributed wrongly to the present genus, must be removed to *Stomylomyia*, Big., and belongs to the *Lomatiinae*.

Several specimens from Willowmore (Cape), December and January, Dr. H. Brauns; the species will be more fully described in my paper on the Bombyliidae of the Hungarian Museum.

## CYLLENIINAE.

## PANTOSTOMUS, n. gen.

## PANTOSTOMUS GIBBIVENTRIS, Bezzi, n. sp.

A species very distinct on account of its gibbose abdominal segments. Some specimens from Willowmore (Cape), December and January, Dr. H. Brauns. The new gen. *Pantostomus* of the *Cylleiniinae* agrees with *Tomomyza* in the absence of ocelli, in the hairy metapleura and in other characters; but it is at once distinguished by the face being practically wanting, the mouth-opening extending to the base of the antennae. Both the new genus and the new species will be fully described in my forthcoming paper on the Hungarian Museum material.

## EXOPROSOPINAE.

## THYRIDANTHRAX, O. Sack.

## THYRIDANTHRAX LUTULENTUS, n. sp.

Near *T. leucoproctus*, but distinguished by the greater size, the dense tufts of yellow hairs on the sides of thorax and by the more yellowish base of the wings.

Type ♀, a single specimen from S.W. Protectorate, Otjiverongo, April, 1921 (J. S. Brown).

♀. Length of body 11 mm.; of wing 10 mm. Head? entirely black; occiput with white scales at eye border, chiefly near the indentation. Frons clothed with short black hairs, more densely on the anterior half. Face bluntly convex, not much, yet distinctly prominent, with black hairs at mouth border and with yellowish ones at sides. Antennae quite black, with the third joint elongate conical.



Proboscis black, not projecting beyond the mouth. Thorax entirely black, clothed on the back with shining scales, which in certain lights are whitish, and seems to be disposed in front on three broad longitudinal stripes; the collar and the sides along the notopleural line bear long and dense tufts of golden-yellow hairs; pleurae black, with like tufts on pro-, meso- and metapleura. Scutellum black, clothed, like the back of mesonotum, with black bristles at hind border. Squamae brown, with white fringe; halteres whitish. Abdomen entirely black; the hairs of sides are white at base and black on the remainder; the third segment has a broad, complete, transverse band of white scales at the base, and similar bands are to be seen on the sixth and seventh segment, the remainder being clothed with black scales. Venter black; spines of the ovipositor reddish brown. Legs black, with smooth front tibiae; front tarsi with short thin hairs; hind femora with a complete row of bristles below; spicules of the 4 posterior tibiae black and long; hairs of coxae black like all the others; claws simple; no pulvilli. Wings proportionately long and broad; they are hyaline, iridescent, with yellowish base and with a faint but distinct yellowish tint along the costal cells and into the basal cells. The veins are yellow, blackened to the terminal half, but the costa is entirely black. Basal hook slender, long, curved, black; basal comb golden, with black bristles at border. Second longitudinal vein originating opposite to the discal cross-vein, with broad and flat loop at end; upper branch of the cubital fork much retreating at base; discal cross-vein placed before the middle of the discoidal cell; first posterior cell long and narrow and slightly but distinctly narrowed at end; second posterior cell at end three times broader than the preceding one and as broad as the following; fourth posterior cell as broad as the two preceding cells taken together, its basal contact with the discoidal cell short, being only a quarter of that of the preceding cell with the same cell; anal cell broadly open. Alula rounded, yellowish, with white fringe; axillary lobe broad, hyaline iridescent.

#### LITORRHYNCHUS, Macq.

##### LITORRHYNCHUS DILATATUS, Bezzi (1921).

Very like a small specimen of *L. maurus* and likewise with black and black-fringed squamae, but belonging to the section of the genus in which the second posterior cell at end is not or only a little more narrow than the third, the vein between them being less twisted.

One ♀ specimen from S.W. Protectorate, Otjiverongo, April, 1921 (J. S. Brown).

The species was described from Central Africa, but seems to be widely spread. In the present specimen the central hyaline spot of the discoidal cell is rather broad, and the anal cell is narrowly hyaline at end.

### EXOPROSOPA, Macq.

#### EXOPROSOPA (EXOPROSOPA) ACRODISCOIDES, n. sp.

A species of the *seniculus* group, near *morosa* and *ignava*, but distinct from both on account of the more lightly coloured body and wings, and of the quite whitish metapleural tuft.

Type ♀ from Nomtele (Ovamboland), February, 1921, and a badly preserved male from Mafa (Ovamboland), February, 1921 (K. H. Barnard).

♂, ♀. Length of body 12–15 mm.; of wing 13–16 mm; spread 31–37 mm. Occiput black, whitish tomentose at border of eyes. Frons of the male only a little more broad than that of the female; it is black on distal half and red on anterior half above the antennae, but more broadly in the female than in the male. The face is likewise more broadly red in the female with a black median spot, while in the male it is black with a red spot on each side. Frons with black hairs on distal half and with yellowish tomentum in front, like the face, which has whitish hairs on the sides and is of conical shape; mouth borders pale yellowish. The basal joints of the antennae are reddish below and black above, and are darker in the male; third joint wanting in case of types. Proboscis black, not projecting. Thorax black, clothed with yellowish scaly tomentum on the back, and with tufts of whitish hairs on the sides; bristles black; pleurae reddish, black spotted, with whitish hairs even on the metapleurae. Scutellum reddish, with a narrow black base, clothed, like the back of the mesonotum, with black bristles at hind border. Squamae brown with whitish fringe; halteres yellowish. Abdomen black, with reddish sides and hind border of segments, in the male almost red, with black spots at base of each segment; the hairs of sides are white near the base, yellowish on the rest with a few black ones; it is clothed above with yellowish scales like those of the back of thorax, but at the base of the second segment and, as it seems, on the second to third terminal segments, there are transverse bands of whitish scales. Venter red, unspotted in the male, with broad black bands in the female, both with whitish tomentum. Spines of the ovipositor reddish. Legs black, but with a reddish-yellow appearance on account of the dense vestiture of scales; spines and spicules black; front tibiae long and smooth; front tarsi shiny

pilose; claws with long and acute basal tooth. Wings whitish hyaline; the fuscous pattern is faintly developed, but ends distinctly in a truncate form into the marginal cell opposite to the marginal cross-vein; the basal and the discoidal cell are less infuscated, and therefore there is a fuscous patch at the end of the discoidal cell which seems sometimes to be isolated as in the species of the *E. heros*-group. First posterior cell narrowed at end, being only a little broader than the anal cell at end; the terminal cross-vein of the discoidal cell is horizontal and somewhat S-shaped; moreover, the discoidal cell has a projection into the third posterior cell of a rather angular shape and appendiculate as in the subgenus *Acrodisca*, from which the present species is distinguished in having elongate and not spiculose front tibiae.

EXOPROSOPA (EXOPROSOPA) ATRINASIS, Speis (1910).

A species of proportionately greater size, very distinct on account of its large wings, which are infuscated along the fore border, and have the cross-vein edged with fuscous, but not in the shape of rounded spots as in the *balioptera*-group. In the key of the species ('Ann. S. Afr. Mus.' xviii, p. 151) the present species should follow No. 39, being distinct from *luteicosta* owing to the more developed wing pattern.

1 ♀ from Pemba, N. Rhodesia (Father Cassett), and another female from Otjiverongo, S.W. Protectorate, February, 1921 (K. H. Barnard).

The species is known from East Africa and Abyssinia, but was also found in Nyassaland; it is pre-eminently a centro-oriental form.

ADDITIONS AND CORRECTIONS TO MONOGRAPH OF SOUTH AFRICAN  
BOMBYLIIDÆ (VOL. XVIII, PT. I, pp. 1—180).

P. 4, l. 37, and p. 178, l. 34, read *Pseudoamictus* instead of *Pseudomictus* and *Pseudomictus*.

P. 5, l. 12, and p. 179, l. 6, read *Tomomyza* instead of *Tomomyra*.

P. 9, after *Bombylius bombiformis* add spec. nov.

P. 52, after *Anastoechus macrophthalmus* add spec. nov.

P. 69, l. 19, and p. 176, l. 17, read *comata* instead of *camata*.

P. 78, after *Corsomyza anceps* add spec. nov.

P. 88, after *Gonarthus* add gen. nov.

P. 99, after *Geron barbatus* add spec. nov.

P. 105, after *Toxophora punctipennis* add spec. nov.

P. 130, after *Oestranthrax* delete (1912) and add gen. nov.

P. 134, after *Thyridanthrax transiens* add spec. nov.

P. 136, after *Thyridanthrax ternarius* add spec. nov.

P. 139, after *Metapenta* add sub. gen. nov.

P. 149, after *Pterobates* add sub. gen. nov.

P. 155, after *Exoprosopa infumata* add spec. nov.

P. 159, after *Exoprosopa perpulchra* add spec. nov.

P. 160, after *Exoprosopa pediformis* add spec. nov.

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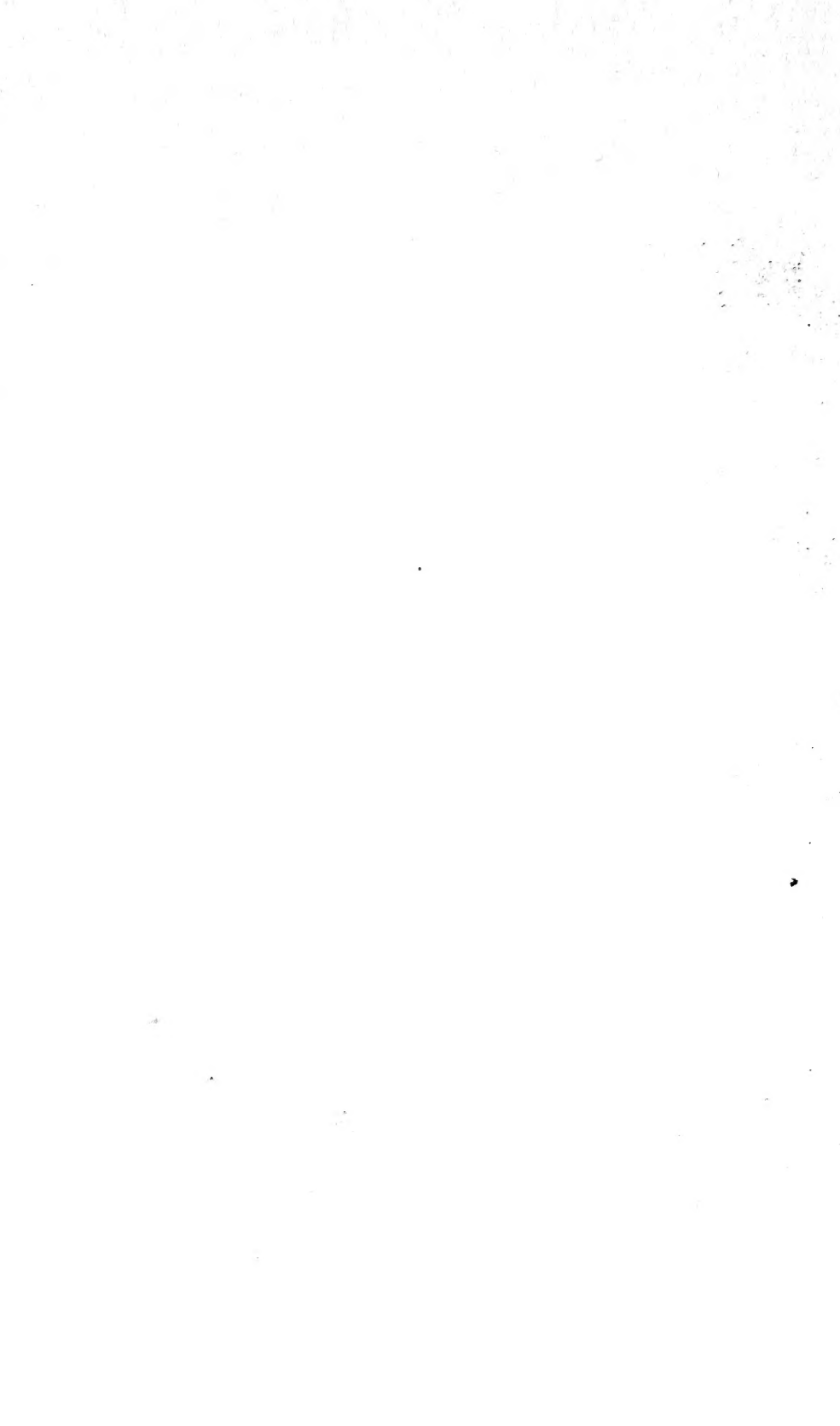
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